United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
08ESMF00-2014-F-0359

APR 2 1 2014

Memorandum

To: Anastasia T. Leigh, Regional Environmental Officer, Mid-Pacific Regional Office, Bureau of Reclamation, Sacramento, California

From: for Jennifer Norris, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Endangered Species Consultation on the Bureau of Reclamation's Proposed Central Valley Project 2014 Water Transfers

This is in response to your March 26, 2014, request for concurrence with your determination that the proposed transfer of up to 295,924 acre-feet of water in 2014 from one or more of 20 water contractors in the Sacramento Valley to agricultural and urban users located in the Sacramento Valley and south of the San Joaquin Delta (Delta) "may affect, but is not likely to adversely affect" the federally-listed threatened delta smelt (*Hypomesus transpacificus*), the threatened San Joaquin kit fox (*Vulpes macrotis mutica*); and may adversely affect the threatened giant garter snake (*Thamnophis gigas*). Included with your request was a Biological Assessment (BA) dated March 2014. In addition, on April 17, 2014, you provided an "Updated Biological Assessment" that included the latest information on drought planning and water allocations.

This response has been prepared pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*), and in accordance with the regulations governing interagency consultations (50 CFR §402). The Bureau of Reclamation (Reclamation) is requesting this consultation on behalf of the contractors that will be selling or buying water as part of the proposed action.

This office has consulted with Reclamation, both informally and formally, seven times since 2000 on various forbearance agreements and proposed water transfers for which water is made available by fallowing rice (and other crops) or substituting other crops for rice in the Sacramento Valley. Although transfers of this nature were anticipated in our biological opinion on the Environmental Water Account (EWA), that program expired in 2007 and, to our knowledge, no water was ever made available to EWA from rice fallowing or rice crop substitution. The need to consult with such frequency on transfers involving water made available from rice fallowing or crop substitution suggests to us a need for programmatic environmental compliance documents, including a programmatic biological opinion that addresses the cumulative effects on giant garter snakes of repeated fallowing over time, and the long-term effects of potentially large fluctuations and reduction in the amount and distribution of rice habitat upon which giant garter snakes in the Sacramento Valley depend.

As a result of discussions during consultation for the 2009 Drought Water Bank (DWB) between Reclamation, California Department of Water Resources (DWR) and the Service (along with representatives from the potential buyer and seller communities); a commitment was made to work together to identify long-term solutions for future water transfers. Currently Reclamation and SLDMWA are preparing a joint EIS/EIR to analyze the effects of water transfers from water agencies in northern California to water agencies south of the Delta and in the San Francisco Bay Area. The EIS/EIR will evaluate transfers of CVP water and non-CVP water supplies that require use of CVP or SWP facilities to convey the transferred water. The EIS/EIR will evaluate water transfers over a 10-year period, from 2015 through 2024. Scoping has been completed for this project and all of the scoping information is available on Reclamation's website at http://www.usbr.gov/mp/cvp/ltwt/. An associated consultation will be initiated concurrently with the development of the EIS/EIR. This environmental compliance process will enable us to collaboratively develop the elements of a program that should streamline administration of such transfers, as well as address the long-term conservation needs of the giant garter snake under Central Valley Project Improvement Act (CVPIA); the Draft Recovery Plan for Giant Garter Snake (Recovery Plan) (Service 1999); our November 2000 Programmatic Biological Opinion on Implementation of the CVPIA; the Continued Operation and Maintenance of the CVP (Service File No. 1-1-98-F-0124) and Endangered Species Act sections 7(a)(1) and 7(a)(2).

We have evaluated the information contained in the Biological Opinions for respective interim and long-term water service contracts of the south of Delta buyers (1) Westlands Water District (Service file 08ESMF00-2014-F-0035); (2) Cities of Avenal, Coalinga, and Huron Service file (08ESMF00-2012-I-0652); (3) San Luis Water District and Panoche Water District Service file (08ESMF00-2013-I-0073); and (4) Banta-Carbona Irrigation District, Broadview Water District, Byron-Bethany Water District, Del Puerto Water District, Eagle Field Water District, James Irrigation District, Laguna Water District, Mercy Springs Water District (unassigned portion), Oro Loma Water District, Patterson Irrigation District, Reclamation District # 1606, Tranquillity Irrigation District, The West Side Irrigation District, West Stanislaus Irrigation District (Service file 1-1-04-I-0707) and it is our determination that the effect of these transfers on San Joaquin kit fox were included in those consultations. We do not anticipate additional adverse effects to San Joaquin kit fox or an increase in the incidental take authorized, beyond what was evaluated in the biological opinions for the respective interim and long-term water service contracts of the potential south of Delta buyers.

After completing a review of the information contained in the above referenced documents and the December 15, 2008, Biological Opinion for the Coordinated Operations of the Central Valley Project and State Water Project (SWP)(OCAP), it is our determination that the effects of these transfers on delta smelt and its critical habitat were included in that consultation. We do not anticipate additional adverse effects to delta smelt or its critical habitat, or an increase in the incidental take authorized, beyond what was evaluated in our December 15, 2008, biological opinion because OCAP addressed the effects to delta smelt for a variety of actions including the transfer of up to 600,000 acre feet through the delta pumps.

Critical habitat has not been designated for either the giant garter snake or the San Joaquin kit fox; therefore, none will be affected.

PROJECT DESCRIPTION

The Proposed Action includes one-year transfers in 2014 over which Reclamation has approval authority, including any transfers that involve CVP water supplies or require the use of CVP

facilities. In 2014 these transfers may result from forbearance[1] actions taken by the sellers and may include Base Supply and Project Water from willing sellers located upstream of the Delta. Water transfers included in the Proposed Action represent only a portion of the expected overall transfers in 2014. The remaining transfers are not dependent on Reclamation's approval; this Biological Opinion considers these transfers in the context of cumulative impacts.

The Proposed Action consists of making up to 295,924 acre-feet of water available for transfer in 2014 by crop idling, crop substitution, and groundwater substitution (Table 1). For 2014, the amount of water made available from cropland idling/shifting of rice land will be up to 168,669 acre-feet (Table 2), which involves the idling of a maximum of 51,112 rice acres (168,669 acre-feet/3.3 acre-feet per acre Evapo-Transpiration Rate of Applied Water(ETAW)) (Reclamation 2014).

In 2014, willing sellers could make water available through groundwater substitution and/or cropland idling/shifting as described below. No other types of water transfers are covered by the evaluation in this Biological Opinion for 2014.

Reclamation approves transfers consistent with provisions of the CVPIA that protect against injury to third parties as a result of water transfers. Several important CVPIA principles include requirements that the transfer will not violate the provisions of Federal or State law, will have no significant adverse effect on the ability to deliver CVP water, will be limited to water that would have been consumptively used or irretrievably lost to beneficial use, will have no significant long-term adverse impact on groundwater conditions, and will not adversely affect water supplies for fish and wildlife purposes. Reclamation will not approve any water transfer for which these basic principles have not been adequately addressed (Reclamation and DWR 2013).

Additional information about water rights protection and water transfers is located at http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/ in a SWRCB staff document titled "A Guide to Water Transfers" (SWRCB 1999).

Cropland Idling and Crop Shifting

Cropland idling/crop shifting would make water available for transfer that would have been used for agricultural irrigation without the transfer. Typically, the proceeds from the water transfer would pay farmers to idle land that they would have placed in production. Rice has been the crop idled most frequently in previous water transfer programs because rice is an annual crop that provides the largest amount of transfer water per acre. The Sacramento Valley contains most of California's rice production; therefore crop idling acquisitions are likely to take place in this region. See Table 3 for

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1 For purposes of this BA, the term "forbear" or "forbearance" will refer to both the Base Supply and Project Water made available under the respective Sacramento River Settlement Contract, although, it is understood the Base Supply will be forborne, while the Project Water will be transferred. . Base Supply and Project Water Supply are terms of art from the Sacramento River Settlement Contract which is available at http://www.usbr.gov/mp/cvpia/3404c/lt_contracts/2005_exec_cts_sac_river/index.html . Base Supply shall mean the quantity of Surface Water established in Articles 3 [refers to Exhibit A: Schedule of Monthly Diversions of Water] and 5 [Constraints on the Availability of Water] which may be diverted by the Contractor from its Source of Supply each month during the period April through October of each Year without payment to the United States for such quantities diverted. Project Water shall mean all Surface Water diverted or scheduled to be diverted each month during the period April through October of each Year by the Contractor from its Source of Supply which is in excess of the Base Supply.

. Estimated acres in rice production ranged over 192,700 acres (from a low of 369,600 acres in 1992 to a high of 562,300 acres in 2004) with an annual average of 487,080 acres. No water was transferred under federal actions during any of these years.

Crop idling transfers consist of water that would otherwise have been used for agricultural production. Water that is made available for transfer will come primarily from idled rice crops in upstream of Delta Region for several reasons:

- Rice provides the largest amount of water per acre idled (approximately 3.3 acre-feet of water per acre idled);
- Rice farmers have expressed interest and have participated in idling programs in the past; and
- Like other small grain crops, rice is not a permanent crop and typically brings in less revenue than permanent horticultural crops (e.g., fruits and nuts), so farmers would likely be more willing to idle lands.

Crop substitution (shifting) is another potential method to purchase water under the proposed action. Crop shifting acquisitions would pay farmers to substitute a crop with one that uses less water, and the amount of water conserved would be available for transfer. Because crop substitution has similar effects to crop idling, it will be included in the crop idling discussion for the remainder of this document.

Table 1. Maximum Amount of Water Proposed for 2014 Water Transfer (Improved Scenario is defined as 75% of Supply for Sacramento River Contractors/50% Supply for Feather River Contractors)

Water Agency	Maximum Transfers
Sacramento River Area of Analysis	
Anderson-Cottonwood Irrigation District	4,800
Canal Farms	860
Conaway Preservation Group	26,639
Eastside Mutual Water Company	2,000
Glenn-Colusa Irrigation District	102,168
Maxwell Irrigation District	7,500
Natomas Central Mutual Water Company	30,000
Pelger Mutual Water Company	4,000
Pleasant Grove-Verona Mutual Water Company	15,000
Princeton-Cordora-Glenn Irrigation District	8,000
Provident Irrigation District	8,000
Reclamation District 108	35,000
Reclamation District 1004	12,900
River Garden Farms	6,000
Roberts Ditch Irrigation Company	3,330
Sycamore Mutual Water Company	14,000
T&P Farms	840
Te Velde Revocable Family Trust	5,387
Feather River Area of Analysis	
Garden Highway Mutual Water Company	3,500
Goose Club Farms and Teichert Aggregates	6,000
Total	**295,924**

Table 2. Lands Proposed for Cropland Idling/Shifting in 2014 (Improved Scenario is defined as 75% Supply for Sacramento River Settlement Contractors/50% Supply for Feather River Settlement Contractors)

Water Agency	Water Involved in Cropland Idling/Shifting (acre feet)	Land Involved in Cropland Idling/Shifting (acres)
Sacramento River Area of Analysis		
Canal Farms	635	192
Conaway Preservation Group	16,014	4,853
Glenn-Colusa Irrigation District	76,000	23,030
Maxwell Irrigation District[2]	7,500	2,273
Pelger Mutual Water Company[2]	1,903	577
Pleasant Grove-Verona Mutual Water Company	9,000	2,727
Princeton-Cordora-Glenn Irrigation District	3,000	909
Provident Irrigation District	3,000	909
Reclamation District 108	20,000	6,061
Reclamation District 1004	7,500	2,273
Roberts Ditch Irrigation Company	2,095	635
Sycamore Mutual Water Company	10,000	3,030
T&P Farms	635	192
Te Velde Revocable Family Trust	5,387	1,632
Feather River Area of Analysis		
Goose Club Farms and Telchert Aggregate	6,000	1,818
Total[1]	**168,669**	**51,112**

Note 1: These totals cannot be added together. Agencies could make water available through groundwater substitution, cropland idling/shifting, or a combination of the two; however, they will not make the full quantity available through both methods. Table 2 reflects the total upper limit for each agency.
Note 2: Under the improved scenario these water agencies could transfer water via cropland idling/shifting however under the most likely scenario these entities are not proposing idling/shifting.

Table 3. Estimated Sacramento Valley Rice Production (acres) from 1992-2011 by County.

Year	Butte	Colusa	Glenn	Sacra-mento	Sutter	Yolo	Yuba	Total	Total Annual Change
1992	76,300	94,800	65,800	8,900	73,100	19,000	31,700	**369,600**	--
1993	79,300	112,000	74,500	10,400	81,000	21,400	31,300	409,900	40,300
1994	88,000	123,000	81,000	11,500	90,000	26,700	34,000	454,200	44,300
1995	83,000	122,000	79,000	10,300	82,000	27,000	32,000	435,300	-18,900
1996	97,000	136,000	87,000	8,800	86,000	21,600	34,000	470,400	35,100
1997	97,000	137,000	89,000	9,400	90,000	24,000	35,000	481,400	11,000
1998	88,000	121,000	83,000	9,100	91,000	20,400	37,300	449,800	-31,600
1999	102,500	135,000	88,000	9,700	104,500	30,000	39,200	508,900	59,100
2000	98,000	145,000	87,500	9,000	108,000	35,500	39,000	522,000	13,100
2001	86,800	126,300	78,300	7,800	87,700	26,000	37,100	450,000	-72,000
2002	100,000	138,500	87,500	8,200	101,700	31,500	36,000	503,400	53,400
2003	87,800	138,000	82,500	8,100	96,900	32,300	35,400	481,000	-22,400
2004	105,800	156,400	90,300	9,600	124,000	41,900	34,300	**562,300**	81,300
2005	96,800	145,600	87,100	7,900	101,800	29,200	33,300	501,700	-60,600
2006	99,100	145,900	87,500	3,700	106,600	28,900	33,200	504,900	3,200
2007	102,000	155,000	86,500	3,700	106,000	23,800	33,700	510,700	5,800
2008	96,500	152,000	84,700	2,500	97,300	27,300	35,200	497,500	-13,200
2009	106,400	150,400	85,700	--	115,300	35,900	38,000	535,600	38,100
2010	93,800	153,000	85,600	--	116,000	41,000	38,700	532,000	-3,600
2011	111,000	154,000	88,600	3,200	123,000	41,000	39,000	561,000	29,000
Average	94,755	137,045	83,955	7,878	99,095	29,220	35,370	**487,080**	--
Source: County Agricultural Commissioner 2012									

Crop idling water would be available at the beginning of the season when the crop is not planted. Reclamation could attempt to retain water acquired from cropland idling in upstream reservoirs until the transfer water could be released and exported through the Delta during July through September. In general, to retain water made available through water transfers in upstream facilities, Reclamation will have had to declare the Delta is in a "balanced" water condition under the terms of the Coordinated Operating Agreement (COA).

Water transfers involving conveyance through the Delta would take place within the operational parameters of Biological Opinions on the Continued Long-term Operations of the CVP and SWP (National Marine Fisheries Service [NMFS] 2009; U.S. Fish and Wildlife Service [USFWS] 2008) (CVP and SWP Operations Biological Opinions) and any other operating rules in place at the time the water transfers are implemented. Because of the extremely dry conditions, Reclamation is consulting frequently with NMFS and USFWS on CVP and SWP operations relative to the CVP and SWP Operations Biological Opinions and special status fish species in the Delta (NMFS 2009; USFWS 2008). The key current operational parameters applicable to conveyance of transfer water include:

- Transfer water will be conveyed through the SWP's Harvey O. Banks Pumping Plant (Banks PP), under permits for Joint Point of Diversion, and the CVP's C.W. "Bill"

Jones Pumping Plant (Jones PP) only during the transfer window that is acceptable to USFWS and NMFS, typically July through September.

- If conditions remain critically dry, water diverted from the Delta would be in compliance with existing outflow criteria and pumping restrictions imposed by the State Water Resources Control Board (SWRCB) through Reclamation and DWR's Temporary Urgency Change Petition approved by the SWRCB on January 31, 2014, as may be amended.

DWR and Reclamation would determine availability of Delta pumping capacity

Groundwater Substitution

Groundwater substitution is a proposed method to make water available for transfer. Groundwater substitution transfers occur when sellers forego their surface water from CVP or base water supplies and pump an equivalent amount of groundwater as an alternative supply. This CVP or base water is then made available to designated buyers north and south of the Delta (tables 6 & 7). Because the potential groundwater substitution transfers are primarily from agricultural users, the water from this acquisition method could be available during the irrigation season of April through October. Sellers could make transfers available during only part of this time by switching between surface water sources and groundwater pumping.

For transfers that must travel through the Delta to reach sellers, Reclamation and DWR would export transfer water during July through September when capacity is available at the Jones PP and the Banks PP. CVP transfer water conveyed at the Banks PP could occur upon the SWRCB's approval of Joint Points of Diversion. Reclamation would attempt to retain surface water made available through groundwater substitution in upstream storage facilities until the Delta export pumps have the capacity available to convey water south. In general, to retain water made available through water transfers in upstream facilities, Reclamation and DWR will have had to declare the Delta is in a "balanced" water condition under the terms of the Coordinated Operating Agreement. Reclamation and DWR will strive to facilitate the conveyance of additional transfer water through the export pumps during the summer months based on the availability of unused export capacity. The risk associated with limited capacity to transfer water at Jones PP and Banks PP is born by the transfer parties.

Transfers made available by groundwater substitution by CVP contractors may yield up to approximately 171,162 acre feet, but the buyers would receive less because of conveyance losses (Table 2).

An objective in planning a groundwater substitution transfer is to ensure that groundwater levels recover to their typical spring high levels under average hydrologic conditions. Because groundwater levels generally recover at the expense of stream flow, the wells used in a transfer will be required to be sited and pumped in such a manner that the stream flow losses resulting from pumping peak during the wet season, when losses to stream flow minimally affect other legal users of water. Sellers would not be paid for pumped water that would result in stream flow losses during the pumping season. DWR and Reclamation have published draft technical information, the Draft Technical Information for Preparing Water Transfer Proposals -- 2014 (Reclamation and DWR 2013), which provides a more detailed explanation of the requirements for siting of groundwater wells and pumping wells for groundwater substitution transfers. This guidance is available at

http://www.water.ca.gov/watertransfers/. For the purposes of this BA, Reclamation assumes that stream flow losses due to groundwater pumping for transfers are 12 percent of the amount pumped for transfers, unless approved site-specific modeling demonstrates that another percentage is more accurate at a local level (Reclamation and DWR 2013).

In some areas, preserves or refuges for aquatic special status species depend on surface water and groundwater resources to provide adequate habitat (Table 4). In basins where sellers are in close proximity to these protected habitats, groundwater substitution will be allowed as part of the 2014 Water Transfers when the seller demonstrates that any impacts to water resources needed for special status species protection have been addressed. For example, the Natomas Basin Habitat Conservation Plan, as implemented by the Natomas Basin Conservancy, specifically provides GGS habitat (per comm. J. Roberts). In very dry years the Natomas Basin Conservancy relies on groundwater resources to provide GGS marsh habitat. Sellers will be required to address third party impacts as part of their mitigation plan and demonstrate that known GGS populations in that groundwater basin have sufficient water. If substantiated third party impacts occur the following actions may be required to address those impacts:

- Curtailment of pumping until natural recharge corrects the issue.
- Lowering of pump bowls in third-party wells affected by transfer pumping.
- Reimbursement for significant increases in pumping costs due to the additional groundwater pumping to support the transfer.
- Other actions as appropriate (Reclamation and DWR 2013).

Table 4. GGS Preserves and Conservation Banks in the Sacramento Valley

Name	County	Organization
Conaway Preserve	Yolo County	Conaway Preservation Group
Gilsizer Slough **-Gilsizer Slough Preserve** (original Preserve for Wild Goose Gas Storage) **-Gilsizer Slough South Conservation Bank(Phases I&II)** **-Gilsizer North Preserve**	Sutter County	Wildlands Inc.
Natomas Basin Preserve	Yolo County	Natomas Basin Conservancy
Pope Ranch Conservation Bank	Yolo County	Wildlands Inc.
Prichard Lakes Conservation Bank	Yolo County	Center for Natural Lands Management
Ridge Cut GGS Conservation Bank	Yolo County	Wildlands Inc.
Sutter Basin Conservation Bank	Sutter County	Westervelt Ecological Services
Tule Basin Giant Garter Snake Mitigation Preserve	Sutter County	Wildlands Inc.
GGS Turnkey and Colusa Basin Mitigation Bank (proposed)	Colusa County	Maxwell Public Utility District
Willey Wetlands Conservation Bank	Yolo County	Center for Natural Lands Management

The proposed action includes groundwater substitution from 20 entities (see Table 2). Before beginning transfer operations, the water transfer proponent will develop a groundwater substitution transfer proposal and provide it to Reclamation. The proposal will include a detailed description of any transfer-related changes to water management operations, a description of the facilities used in the operation, and a monitoring and mitigation plan.

Conservation Measures

This section presents environmental commitments included in the Proposed Action to reduce and minimize potential environmental impacts from 2014 water transfers (40 CFR 1505.3; 16 U.S.C. § 1536(a)(1)) . One of the main goals is to maintain water in canals and ditches known to be suitable for GGS and is known to have 85% of the known GGS occurrences (BA section 2.4 and Appendix 1)

Groundwater Substitution and Cropland Idling/Shifting Transfers

- Carriage water will be used to maintain water quality in the Delta.

Groundwater Substitution Transfers

- Well reviews and monitoring and mitigation plans will be implemented to minimize potential effects of groundwater substitution on nearby surface and ground water resources. Well reviews, monitoring and mitigation plans will be coordinated and implemented in conjunction with local ordinances, basin management objectives, and all other applicable regulations. DWR and Reclamation have published draft technical information related to cropland idling/shifting and groundwater substitution transfers in the Draft Technical

Information for Preparing Water Transfer Proposals -- 2014 (Reclamation and DWR 2013), which is available at http://www.water.ca.gov/watertransfers/.

- In groundwater basins where sellers are in the same groundwater subbasin as protected aquatic habitats, such as GGS preserves and conservation banks, groundwater substitution will be allowed as part of the 2014 Water Transfers if the seller can demonstrate that any impacts to water resources needed for special status species protection have been addressed. In these areas, sellers will be required to address these impacts as part of their mitigation plan.

Cropland Idling/Shifting Transfers

- As part of the approval process, Reclamation will have access to the land to verify how the water transfer is being made available and to verify that the actions to protect the GGS are being implemented.
- Reclamation will provide a map(s) to USFWS in May of 2014 showing the parcels of riceland that are idled for the purpose of transferring water in 2014. These maps will be prepared to comport to Reclamation's GIS standards.
- Water transfers will not be approved from a field fallowed during the two previous years (water may be made available from the same parcel in successive years) (Reclamation and DWR 2013).
- Movement corridors for GGS include the major irrigation and drainage canals. The water seller will keep at least two feet of water in the major irrigation and drainage canals (but never more than existing conditions).
- The focus of GGS conservation in districts proposing water transfers made available from fallowed rice fields will be to ensure adequate water is available for priority suitable habitat with a high likelihood of GGS occurrence as described and shown in the BA - appendix 1.
    - The determination of priority habitat will be made through coordination with GGS experts, GIS analysis of proximity to historic tule marsh, and GIS analysis of suitable habitat. The priority habitat areas are indicated on the priority habitat map which will be maintained by FWS. In addition, fields abutting or immediately adjacent to federal wildlife refuges will be considered priority habitat.
    - Maintenance water in smaller drains and conveyance infrastructure supports key habitat attributes such as emergent vegetation for GGS for escape cover and foraging habitat. If crop idling/shifting occurs in priority habitat areas, Reclamation will work with contractors to document that adequate water remains in drains and canals in those priority areas. Documentation may include flow records, photo documentation, or other means of documentation agreed to by Reclamation and USFWS.
    - Areas with known priority GGS populations will not be permitted to participate in cropland idling/shifting transfers. Water sellers can request a case-by-case evaluation of whether a specific field would be precluded from participating in 2014 Water Transfers. These areas include:
        - Fields abutting or immediately adjacent to Butte Creek, Colusa Drainage Canal, Gilsizer Slough, the land side of the Toe Drain along the Sutter Bypass, Willow Slough and Willow Slough Bypass in Yolo County; and

– Lands in the Natomas Basin.

CALFED Ecosystem Restoration Program and the Conservation Strategy

The EWA Biological Opinion stated that Implementing Agencies (i.e. FWS, CDFW, and NMFS) shall develop a Conservation Strategy for the GGS through the Ecosystem Restoration Program (ERP). The Implementing Agencies did not complete the Conservation Strategy through the ERP. However, research and monitoring have continued to support a more comprehensive approach to GGS conservation. In 2009, DWR developed a GGS Baseline Monitoring and Research Strategy to help quantify and evaluate the response of the GGS to rice land idling. Since 2009, DWR developed fundamental information about the GGS's ecology as it relates to the potential impacts from rice land idling. DWR is in the third year of working with the USGS Western Ecological Research Center (WERC) on the study of GGS. DWR's broad objective is to provide scientific information to the FWS in support of developing compliance with ESA with respect to rice land idling for the purpose of water transfers. Central to this will be assessment of the impacts, if any, of rice land idling on the GGS. The purpose is to mitigate the impacts to the GGS from rice land idling for water transfers.

Up until now the study has focused on foundational studies. These include distribution and demographic analysis of the GGS in the Sacramento Valley. The main revelations are that the GGS is confined mostly to its native habitat (historic wetlands) when current environmental factors are conducive to its survival (aquatic habitats such as rice fields and associated irrigation and drainage canals). This has suggested to WERC that the GGS is not very mobile.

Other work has centered on improving trapping techniques for the GGS. Traps available at the start of the study where very ineffective and inefficient at trapping GGS and since much of the work going forward will rely on the trapping of the snake to make inferences regarding the impact of rice land idling it was necessary to improve the trapping efficiency.

Presently, WERC is in the process of completing a comprehensive literature review and conceptual model for the GGS From this information DWR will develop a research framework, a blueprint, to guide the research. DWR will do this in cooperation with a technical review committee made of internal and external (to DWR) scientists (pers comm. Vargas 2014).

DWR has in place $9,000,000 of funding to support the research work to be completed by USGS on GGS and task orders utilizing these funds are being executed to supplement the current knowledge of GGS populations and habitat use. Most recently, five tasks orders in 2012 were funded to support GGS research, these include:

- Distribution of Giant Garter Snake and the probability the species occurs at a given location, in the Sacramento Valley, California.
- Assessment of Distribution of the Giant Garter Snake in the Sacramento Valley, California;
- Assessment of Trap Modifications to Increase Capture and Detection Probabilities of the Giant Garter Snake
- Review and Development of a Conceptual Model of Giant Garter Snake Ecology and Conservation, in the Sacramento Valley, California; and

- Assessment of Realized Giant Garter Snake Detection and Capture Probabilities using Modified Floating Aquatic Funnel Traps, in the Sacramento Valley, California.

Central Valley Project Conservation Program (CVPCP) and Central Valley Project Improvement Act Habitat Restoration Program (HRP)

The Central Valley Project Conservation Program (CVPCP) was developed during the Section 7 consultation process for the CVPIA and renewal of CVP water service contracts. Accordingly, the CVPCP implements actions to protect, restore, and enhance special status species populations and habitats affected by the CVP, with special emphasis on federally listed species. The CVPIA Habitat Restoration Program (HRP) was established under Title XXXIV, Section 3406 (b) (1) "other" of the CVPIA under the "Fish and Wildlife Restoration Activities" section. The HRP also implements actions to improve conditions for species impacted by operation of the CVP. Reclamation and USFWS coordinate administration of these two grant programs based on the authority established in the Fish and Wildlife Coordination Act, as amended, 16 U. S.C. Section 661 et seq of 1956; the Fish and Wildlife Act of 1956, 16 U. S. C. 742(a-j); and the CVPIA of 1992, Public Law No. 102-575. Title XXXIV, Section 3406(b)(1). Jointly, CVPCP and HRP provide financial support for research on various aspects of biology, ecology, genetics, as well as, habitat improvements for special status species in the Central Valley.

One of CVPCP/HRP Priority Actions supports GGS research and habitat improvements. In order to identify the highest priority needs to which grant funds are directed each year, CVPCP/HRP managers work directly with FWS to identify Priority Actions. FWS identifies research and habitat improvement priorities based on recovery actions identified in recovery plans for federally listed species and expert opinion on which CVP-impacted federally listed species having the greatest recovery needs and/or which species face the greatest risk of extinction. Research and habitat improvement proposals which most closely align with the Priority Actions receive preference and are more likely to be funded by the CVPCP/HRP programs. Since the inception of the CVPCP and HRP in the mid-1990s, research yielding information on GGS has routinely been identified as a top Priority Action and been funded (Table 5).

Table 5 CVPCP/HRP Funded GGS Grants (pers. comm. D. Strait 2013)

Year	Project	Funding ($)
2009	Giant Garter Snake Distribution/Modeling - Butte County	180,000
2009	Giant Garter Snake Surveys, White Slough	122,648
2008	Giant Garter Snake Habitat Restoration, Cosumnes Preserve, Badger Creek	142,225
2007	Giant Garter Snake Genetic Study	60,210
2007	Giant Garter Snake Surveys, Merced and Fresno Counties	157,655
2004	Giant Garter Snake Surveys Colusa NWR	88,619
2004	Giant Garter Snake Surveys San Luis NWR	237,879
2003	Giant Garter Snake Surveys Colusa NWR	70,900
2002	Giant Garter Snake Surveys at Colusa NWR	38,060
2002	Giant Garter Snake – Surveys San Luis NWR (Grasslands)	53,200
2002	Giant Garter Snake – Surveys Grasslands Water District	157,760
2001	Giant Garter Snake Monitoring	67,570
2000	Giant Garter Snake Census	38,000
1997	Giant Garter Snake – Multi-year Surveys Colusa NWR	486,500

ACTION AREA

The Proposed Action area includes those areas of California that might receive benefits from the 2014 water transfer actions or areas potentially affected by the 2014 Water Transfers because they serve as a site for water acquisition or conveyance (Figure 1). Water conveyance through the Delta is a significant constraint. Water transfers originating upstream from the Delta and going to service areas served by the CVP and SWP export pumps would require moving water through the Delta. Constraints to transferring water through the Delta range from physical limitations to regulatory requirements. Reclamation and DWR will ensure careful coordination of transfers with existing CVP and SWP operations in meeting water rights, water quality, and fishery protection measures when approving potential water transfers moving water through the Delta.

The overall action area includes specific areas of analysis for each resource that may be directly or indirectly affected by potential water transfers. In a general sense, these areas of analysis comprise (1) watersheds of rivers that may participate in groundwater substitution or cropland idling/shifting; (2) rivers used to convey transfer water; (3) lands that may be used for cropland idling/shifting and adjacent lands; (4) groundwater basins that may be affected by groundwater substitution (5) district, on-farm and CVP or SWP conveyance facilities; and (6) storage and conveyance facilities in areas that would receive water from transfers. The action area includes:

- Upstream dams and reservoirs on the Sacramento River where water may be acquired including:
  - Shasta Reservoir (Sacramento River);
  - Oroville Reservoir (Feather River); and
  - Merle Collins Reservoir, on Dry Creek (a tributary to the Yuba River); and
- Water bodies downstream from the above reservoirs, including;
  - Sacramento River;
  - Feather River;
  - Yuba River;
- The Sacramento-San Joaquin Delta;
- Portions of the CVP and the SWP systems;
- San Luis Reservoir;
- Agricultural lands in the Sacramento Valley (Colusa, Glenn, Sutter, Butte, and Yolo Counties) in which farmers participate in crop idling/shifting; and
- Groundwater basins that participate in making water available for transfer via groundwater substitution.

Table 6 and Table 7 identify potential buyers who may be interested in participating in the 2014 water transfers. The buyers are separated into those that are upstream from the Delta and part of the Tehama-Colusa Canal Authority or in the Export Service Area (areas served by the Delta export pumps, Jones PP and Banks PP) and part of the San Luis and Delta-Mendota Water Authority. Not all of these potential buyers may purchase transfer water. Purchase decisions depend on a number of factors, including hydrology, water demands, availability of other supplies, and transfer costs.

A major concern to potential buyers in the Export Service Area is the ability to deliver the purchased water through the Delta to the buyer's service area. Export of the transfer water through the Delta is dependent on availability of capacity at the CVP or SWP pumping facilities and subject to other operational requirements. Available CVP and SWP capacity is severely limited due to operational and regulatory restrictions. The pumping window for transfers is currently July through September. Pumping within this window can be further reduced or expanded based on specific hydrologic conditions and regulatory compliance or water quality issues. Reclamation and DWR cannot guarantee that a specific quantity of transfer capacity would be available.

Reclamation and DWR petitioned the State Water Resources Control Board (SWRCB) to temporarily consolidate the CVP and SWP places of use, and the SWRCB granted that consolidation.

Table 6. Potential Buyers – North of the Delta

Tehama-Colusa Canal Authority
Colusa County Water District
Corning Water District
Cortina Water District
Davis Water District
Dunnigan Water District
4-M Water District
Glide Water District
Kanawha Water District
Kirkwood Water District
Orland-Artois Water District
Westside Water District

Table 7. Potential Buyers – South of the Delta

San Luis & Delta-Mendota Water Authority
Avenal State Prison
Broadview Water District
Banta-Carbona Irrigation District
Byron Bethany Irrigation District
City of Avenal
City of Coalinga
City of Huron
Del Puerto Water District
Eagle Field Water District
James Irrigation District
Laguna Water District
Mercy Springs Water District
Oro Loma Water District
Pacheco Water District
Panoche Water District
Patterson Irrigation District
RD 1606
San Benito County Water District
San Luis Water District
Santa Clara Valley Water District
Tranquility Irrigation District
West Side Irrigation District
West Stanislaus Irrigation District
Westlands Water District

The Central Valley is divided into four recovery units for the giant garter snake and further subdivided into nine recovery units in the 5-Year Review (FWS 1999 and 2012). The action area includes all or part of each of these recovery units described in the Draft Recovery Plan and the 5-Year Review.

Consolidated Place of Use. Reclamation and DWR are assessing the need for a petition to the SWRCB to temporarily consolidate the CVP and SWP places of use similar to that filed by the Projects in 2009. Approval of a consolidated place of use would allow transfers from CVP contractors contemplated in this EA to SWP contractors south of Banks or Barker Slough PP which are outside the CVP authorized place of use. Reclamation will not approve any CVP water transfers to buyers outside of the CVP place of use unless the SWRCB approves a Petition for Change (either

through a joint petition to consolidated the CVP and SWP places of use or through individual petitions for change) authorizing the delivery of water outside the CVP place of use.

The joint point of diversion authorization contained in Water Rights Decision 1641 allows the CVP and SWP to use the other's facilities to divert or convey water under certain terms and conditions, but it does not allow delivery of that water to outside that Project's existing authorized place of use. Without SWRCB approval of a Petition for Change, CVP water could only be delivered within the CVP authorized place of use.

CONSULTATION HISTORY

October 2013	DWR and Reclamation post Draft Technical Information for Preparing Water Transfers Proposals on DWR's website http://www.water.ca.gov/watertransfers/.
November 27, 2013	Meeting conducted between Reclamation and FWS to discuss how to work together to consult on 2014 water transfers if the 2014 water year is another dry year. Reclamation wanted to know if the 2010 Biological Opinion for a Water Transfer Program in 2010 and 2011 might be amended as no water transfer had been initiated utilizing that opinion. As the 2010 Biological Opinion had expired, the FWS needed to consider whether the circumstances and actions being considered for consultation in the 2014 would be equivalent to those described in 2010. Both agencies agreed to start to evaluate the new and existing information available on GGS for a possible consultation on 2014 water transfers.
January 17, 2014	The Governor of California declares a drought state of emergency.
January 31, 2014	Meeting conducted between Reclamation, potential water sellers (Glenn Colusa Irrigation District, Reclamation District 108, and MBK consultants), and FWS regarding the draft environmental commitments to be considered for inclusion in the 2014 water transfer project description. Reclamation made the recommendation that the environmental commitments for water transfers in 2014 should reflect new information on GGS distribution and habitat suitability in the Sacramento Valley published since the prior Biological Opinion in 2010. Glenn Colusa Irrigation District, Reclamation District 108, and MBK consultants reviewed the potential changes in the environmental commitments and agreed to provide feedback on whether the revamped environmental commitments would be feasibility for the water sellers.
February 21, 2014	CVP water service contractors' initial allocations are 0 percent, and Sacramento River Settlement Contractors and wildlife refuges are notified that they can expect 40 percent of their contract amounts rather than the anticipated 75 percent normally provided in a critically dry years.

March 4, 2014	Meeting held between FWS, DWR, USGS, and CDFW focused on the draft GGS environmental commitments. Reclamation made the recommendation that the environmental commitments for water transfers in 2014 should reflect new information published since the prior Biological Opinion in 2010. USGS concurred that their data supported revision to the environmental commitments and provided refinements to the technical analysis used to depict areas of highly suitable habitat which likely contained GGS populations. Reclamation asked for feedback on the draft language and agreed to modify the technical analysis used to depict GGS priority habitat areas.
March 13, 2014	Reclamation distributes the "Water Transfers for the Tehama-Colusa Canal Authority in 2014 Environmental Assessment and Initial Study" as well as the "Water Transfers for the San Luis Delta Mendota Water Authority in 2012 Environmental Assessment and Initial Study".
January 2014 -March 2014	Reclamation participates in monthly Interagency Coordination meetings with DWR, CDFW, SWRCB, NMFS, and USFWS.
March 26, 2014	Request for Initiation of Formal Consultation on 2014 Water Transfers was received from Reclamation.

ANALYTICAL FRAMEWORK OF THE JEOPARDY DETERMINATION

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which evaluates the giant garter snake range-wide condition, the factors responsible for that condition, and their survival and recovery needs; (2) the Environmental Baseline, which evaluates the condition of the giant garter snake in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the giant garter snake; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the giant garter snake; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the giant garter snake.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the giant garter snake current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the giant garter snake in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the giant garter snake and the role of the action area in the survival and recovery of the giant garter snake as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

STATUS OF THE SPECIES

Giant Garter Snake

Please refer to the Giant Garter Snake (*Thamnophis gigas*) 5-year Review: Summary and Evaluation (Service 2012) for the current status of the species. Since issuing the GGS 5-Year Review there have been no significant changes in the status of the species.

ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of past and ongoing human and natural factors leading to the current status of the species within the action area. The baseline includes State, tribal, local, and private actions already affecting the species or that will occur at the same time as this consultation. The ongoing actions associated with the long-term renewal of the CVP water contracts for the Sacramento River Division, the Shasta Division, the Trinity River Division, and the Sacramento River Settlement Contractors are considered in the baseline. The action area includes the entire range of the giant garter snake.

For the most recent comprehensive assessment of the species' range-wide status, please refer to the *Giant Garter Snake (Thamnophis gigas) 5-year Review: Summary and Evaluation* (Service 2012). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 2012 5-year review was finalized, with loss of aquatic and upland habitat being the most significant effect. While there have been continued losses of habitat throughout the species range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

Status of Populations in the Sacramento Valley

Since 1995, USGS-WERC has studied snake sub-populations at the Sacramento, Delevan, and Colusa NWR's and in the Colusa Basin Drain within the Colusa Basin; at Gilsizer Slough within the Sutter Basin, at the Badger Creek area of the Cosumnes River Preserve within the Badger Creek/Willow Creek area of the Delta Basin, and in the Natomas Basin within the American Basin (E. Hansen 2003, 2004; Wylie 1998, 2003; Wylie *et al.* 1995; Wylie *et al.* 2002; Wylie *et al.* 2003a, 2004a; Wylie *et al.* 2003b, 2004b). These protected and managed areas contain the largest extant giant garter snake sub-populations.

Outside of protected areas, however, garter snakes are still subject to all of the threats identified in the final rule to one degree or another. The other sub-populations are distributed discontinuously in small, isolated patches, and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes (Goodman 1987).

The Sacramento Valley is generally rural in nature, with expanses of agricultural lands surrounding small towns. The lands within the action area that are going to be affected by the crop idling or groundwater substitution is normally maintained as agricultural fields with irrigation and drainage canals between the fields. The primary crops grown include rice (including white, wild and organic rice), with a mix of row or grain crops and orchards in the higher elevations. The canals have narrow growths of tules or similar types of wetland plants, and there is a narrow band of riparian vegetation (willow and small cottonwood) adjacent to the flood control levees toe drains inside the Sutter and Yolo Bypass. In the Sacramento Valley, rice fields and the associated waterways make up

the majority of the habitat available for the giant garter snake. The snake is also found in native and restored wetlands on State and Federal lands, but these wetland habitats are not distributed evenly across the Sacramento Valley landscape.

Many areas within the Sacramento Valley contain little protected wetland habitat. For example, the southern end of the Colusa Basin, the Sutter Basin, and the American Basin including the Natomas Basin and southern American Basin between the Bear River and Natomas Cross Canal have no or few Federal or state refuges and wildlife areas. In these areas, giant garter snakes are almost entirely dependent on rice agriculture and its associated waterways for their survival and do not have core wetland habitat areas to buffer against the effects of fluctuations in rice production. As of 2014,the Natomas Basin Conservancy has created approximately 4,100 acres of managed marsh habitat and protected rice habitat in the Natomas Basin as mitigation under the Natomas Basin Habitat Conservation Plan. The total acreage of Federal and state lands known to support giant garter snakes within Butte, Colusa, Sutter, and American Basins equals 44,184 ac.; includes Sacramento, Colusa, Delevan, Sutter, and Butte Sink NWR's, Upper Butte Basin WA, Gray Lodge WA, Gilsizer Slough CE).

The giant garter snake currently occupies these remnant native marshes and sloughs, restored wetlands, low gradient streams, and agricultural wetlands including irrigation and drainage canals, and rice fields and the adjacent upland habitats. The loss of wetland ecosystems and suitable habitat has resulted in the use by the giant garter snake of highly modified and degraded habitats. Located among cultivated farm lands, these areas include irrigation ditches, drainage canals, rice fields, and their adjacent uplands (Service 1999). As described above, there are known populations of giant garter snake found on the Federal and state refuge or preserve areas in the Sacramento Valley, and it has been documented that giant garter snake are also known to be present in rice fields (Service 1999). Some recent studies have concluded that giant garter snakes have adapted to the mosaic of seasonal wetlands and upland habitats that rice cultivation mimics, and use flooded rice fields for foraging, and irrigation dikes for basking sites (Service 1999). Giant garter snakes have been captured in ditches with apparent poor habitat and lack of vegetative cover, but were immediately adjacent to and presumably benefitted from nearby rice fields (Wylie *et al.* 2002b). Snakes in canals are subject to predation at a slightly greater level due to the fact that wetlands and rice fields have such dense cover that escape from most predators is quite easy. Neo-nates and juveniles are safer in rice fields than in canals because of the density of the cover provided by the vegetation, and the lack of the edge effect found in canals. The neo-nates will remain in the shallow wetland feeding on tadpoles, invertebrates, and very small mosquitofish until the rice field is drawn down or until it is time to hibernate in the fall (Wylie 2008 pers comm.). The presence of a shallow wetland is vital for the survival of the neo-nates to adulthood (Wylie 2008 pers comm.).

Fallowing rice lands as part of forbearance or water transfers was proposed in 2001, 2003, 2005, and 2008. It is not known how much of the water actually was delivered to users south of the Delta. Data regarding fallowed rice acreage within the western portion of the Sacramento Valley in 2001, 2003, and 2005 showed there were 13,899 acres, 29,985 acres (Service files 1-1-03-I-1079 and 1386), and 18,181 acres (Service file 1-1-05-I-0941) fallowed respectively for prior transfer program purposes. During 2008, Conaway Preservation Group transferred 22,552 acre-feet of CVP water to the San Luis and Delta Mendota Water Authority which resulted in the fallowing of 3,500 acres of rice land (Service file 81420-2008-F-1596-1). During 2008, the following non-federal districts located in Butte County transferred up to 61,172 acre-feet of water fallowing approximately 18,537 acres of rice land: Richvale ID, Biggs West Gridley WD, Butte WD, Sutter Extension WD, and Western Canal WD (these transfers were not consulted on with the Service). During the time that

the Environmental Water Account was in effect (2001 – 2007), an annual average of 192,640 acre feet of water was purchased for the various environmental purposes (primarily fisheries related) being served by the EWA, although to our knowledge none of this water was obtained by idling rice fields.

Colusa Basin Sub-population. The action area includes the Colusa Basin snake sub-population, in the Sacramento Valley Recovery Unit as defined in the draft Giant Garter Snake Recovery Plan (U.S. Fish and Wildlife Service (Service) 1999). Twenty-nine California Natural Diversity Database (CNDDB, 2007) records are known from the Colusa Basin. These records include the Delevan NWR, Glenn-Colusa Canal, Colusa Drain, several tributary streams between the towns of Williams and Maxwell, and other locations within the Basin.

Within the Colusa Basin, the U.S. Geological Survey (USGS) has conducted trapping surveys of giant garter snakes at the Sacramento NWR Complex (Wylie *et al.* 1997b, 2000, 2002b). Wylie, in conjunction with Refuge staff, observed giant garter snakes at each of the Federal wildlife refuges (Colusa, Delevan, and Sacramento) that comprise the Sacramento NWR complex. Wylie *et al.* (2000a, 2002a) located 81 and 102 giant garter snakes, respectively, in the years 2000 and 2001 within the Colusa National Wildlife Refuge. It is likely that giant garter snakes occur outside of Refuge lands in the adjacent rice production areas.

Studies by USGS-WERC (formerly Biological Resources Division) are underway at the Colusa NWR and in the Colusa Basin Drainage Canal (Wylie 2000, 2003; Wylie and Martin 2004; Wylie *et al.* 1997; Wylie *et al.* 2002; Wylie *et al.* 2003a, 2004a; 2005). Density estimates range from 36 to 95 snakes per kilometer depending on the trapping location (Wylie *et al.* 2004a) and in 2005, the population estimate in Colusa NWR ranged from 97 snakes per kilometer in the Glenn-Colusa Canal to 126 snakes per kilometer in the T24.11 cells; and in 2005, the population estimate in Sacramento NWR at Logan Creek was 31 snakes per kilometer (Wylie *et al* 2005). The size distributions found in the Colusa NWR continue to reflect a healthy population of giant garter snakes with successful recruitment of young (Wylie *et al.* 2004a, 2005). Results of a study conducted in 2005 to identify key snake habitats and use areas on the Sacramento NWR complex indicate the presence of snake populations at Delevan NWR (9 individuals captured); Sacramento NWR (45 individuals captured) and Colusa NWR (75 individuals captured). At Colusa NWR, 35 of the snakes were captured in previous years; which indicates to Wylie that giant garter snakes are increasing their use of the restored wetlands (Tract 24). At Sacramento NWR, the captures and recaptures occurred throughout the refuge indicating that this unit provides valuable habitat for the snake (Wylie *et al.* 2005). The Colusa NWR represents a stable, relatively protected sub-population of snakes within the Colusa Basin.

Outside of protected areas, however, snakes in the Colusa Basin clusters are still subject to all threats identified in the final rule, including habitat loss due to development, fluctuations in the number of acres in rice production, maintenance of water channels, and secondary effects of urbanization. Restored areas that provided summer water were more effective in meeting the habitat needs of the snake in the 2000-2001 study periods; therefore, snakes did not have to venture as far as in previous years to find aquatic habitat during their active period. This was also found to be true for monitoring conducted during 2005. Sampling of the restored areas in Colusa NWR during the summers of 2002 and 2003 continued to document use of the restored wetland area as the habitat quality improves. The aquatic component of the habitat is important because the snake forage on frogs, tadpoles and fish. Most of the radio-marked snakes were captured along the water's edge of the wetlands (Wylie *et al* 2005). USGS-WERC also concluded that reduced movements indicated

that giant garter snakes were less exposed to mortality factors such as predators and vehicles (Service 1999, Wylie and Casazza 2000, Wylie et al 2002).

The 2005 Monitoring Report for the Colusa NWR (Wylie *et al* 2005) concluded that, "The management of the Colusa Refuge for giant garter snakes, which began with the restoration of Tract 24, has clearly benefitted the snakes in the restored wetlands and other habitats by maintaining and increasing stable summer water habitats for the snakes, maintaining connectivity among wetland habitats and carefully managing marsh vegetation."

Stony, Logan, Hunters, and Lurline Creeks, as well as the Colusa Drain, and Glenn-Colusa, Tehama-Colusa, and Colusa Basin Drainage Canals, and associated wetlands, are important as snake habitat and movement corridors for giant garter snake. These waterways and associated wetlands provide vital permanent aquatic and upland habitat for snakes in areas with otherwise limited habitat (Wylie *et al.* 2005).

A habitat conservation bank has been established east of Williams in Colusa County in part for the purpose of selling giant garter snake credits to developers or others who need to compensate for environmental impacts to the species from their projects. Dolan Ranch, a 251-acre ranch in Colusa County, has sold all of their giant garter snake credits, ensuring that the habitat on the site is managed for the benefit of the species and protected in perpetuity. Although the giant garter snake has not yet been observed on the bank, known occurrences of the snake are located within five miles of Dolan Ranch Conservation Bank. Other giant garter snake habitat has also been preserved, created, or restored in the action area as a result of section 7 consultations between the Service and other Federal agencies.

Sutter and Butte Basin Sub-populations. The action area includes the Sutter and Butte Basin sub-populations in the Sacramento Valley Recovery Unit (Service 1999). In 1996, Wylie *et al.* (1997b) surveyed rice fields in the Butte Basin near Butte Sink (Butte County) but failed to find giant garter snakes. Though the Butte Basin has not been comprehensively surveyed, giant garter snakes have been reported from the State Gray Lodge Waterfowl Management Area and other locations. Three occurrences of the snake have been reported in the vicinity of the City of Chico in Butte County (E. Hansen pers. comm. 2006, D. Kelly pers. comm. 2006, Galloway 2008). The northernmost sighting extends the extant range of the species to the north by approximately 9.5 miles. Giant garter snake occurrences were documented in the wetlands and canals within the Sutter Basin in the 1990's and in 2005, in portions of Gilsizer Slough, Sutter County (Wylie *et al.* 1997b, CNDDB 2007). Within the Sutter Basin, portions of Gilsizer Slough, Sutter County were surveyed by walking the canal and ditch banks and snakes were captured either by hand or using floating minnow traps in both 1995 and 1996. Approximately 145 giant garter snake occurrences were documented in rice fields, wetlands, and canals during both years (Wylie *et al.* 1997b). In addition, the Service has authorized the establishment of the 397 acre Sutter Basin Conservation Bank southwest of Yuba City in Sutter County.

USGS-WERC has conducted studies at Gilsizer Slough, surrounding lands, and associated irrigation canals (Wylie *et al.* 1995; Wylie *et al.* 1997). Giant garter snakes were shown to use canal, marsh, and rice habitat (Wylie *et al.* 1995; Wylie *et al.* 1997). Giant garter snakes were particularly associated with irrigated canals that had thickly vegetated slopes. Fifty-five percent of telemetered giant garter snakes used rice fields at some time (Wylie *et al.* 1997). Because of few recaptures and no clearly defined capture/recapture events, estimation of total numbers of giant garter snakes in the Gilsizer area was not possible; however, USGS-WERC speculates that numbers may be in the hundreds.

Much of the Gilsizer Slough area is protected by the State. Also, 162 acres (66 hectares) of the Slough is protected as a result of compensation for the Wild Goose Gas Pipeline and State Route 70-Algodon Road Interchange projects.

Yolo Basin Sub-population. The action area includes the Yolo Basin sub-population in the Mid-Valley Recovery Unit (Service 1999). Thirty-three CNDDB (2007) records for giant garter snake are known from within eight miles of the action area. However, 28 of these records are from the Natomas Basin, which is separated from the Yolo Basin by the Sacramento River and serves to isolate the populations. The five remaining records are located inside the action area footprint.

We do not have a clear understanding of the baseline population for giant garter snake within the Yolo Basin. Giant garter snake are known to be present in the action area; however their distribution within the landscape is unknown at this time; they may be evenly distributed throughout the suitable habitat (rice fields) or they may be limited to the areas closest to publicly controlled lands such as the Sacramento NWR complex, Gray Lodge Waterfowl Management Area, and the Yolo Wildlife Area.

The status of giant garter snake in the Yolo Basin is not well known because few surveys have been conducted to determine the extent of the population. CNDDB records are primarily in areas that are located along public roadways or other areas open to the public. As a result of this limited access to potential garter snake habitat, there is very limited information available concerning population levels of garter snake within the Yolo Basin. These records indicate that giant garter snakes are present inside the Conaway Ranch, which is located south of Woodland and east of Davis, but the level and distribution of that population is not known.

As an active floodway, the Yolo Bypass' dynamic hydrology may also play a role in population structure. Genetic analyses of tissue samples collected from giant garter snakes in the Yolo Wildlife Area and adjacent rice lands during these surveys are ongoing. Engstrom (2007) reports that the Yolo Basin sub-population is genetically very similar to those of the Natomas and Middle American Basins, but that genetic diversity within the Yolo Basin is lacking, which is typical of recently colonized populations. Populations identified as being recently colonized may have been present for more than 200-years (Eric Hansen pers comm. July 2008). However, there appears to be very little gene flow between the Yolo, Natomas, and Middle American Basins, and ongoing migration into the Yolo Basin is not significant.

During the past three years surveys conducted in the canals and wetlands along and within the western edge of the Yolo Bypass south of Conaway Ranch have documented the presence of giant garter snake (Eric Hansen, February 2008 letter to David Kelly of the Service). The results of these surveys have not yet been entered into the CNDDB. The surveys were conducted in the Yolo Wildlife Area (south of Interstate 80); in the rice lands immediately west of the Yolo Bypass (south of Interstate 80); in the Willow Slough Bypass south of the Davis Wastewater Treatment Plant; the wetlands and perimeter ditches at the Davis Wetlands complex southeast of the Davis Wastewater Treatment Plant; and the ditches and ponds on a private parcel (Smith Farms) adjacent to the Pope Ranch Mitigation Bank, west of the Sacramento River Deep Water Ship Channel (E. Hansen February 2008, letter to David Kelly of the Service).

Fifty-one individual giant garter snakes – 32 females and 19 males – were captured comprising 59 total capture events; six snakes were captured more than once. The majority of individuals (n=36) were captured within the Davis Wetlands complex (29 in the wetlands and seven in the perimeter

ditches); these are the first observations of giant garter snakes recorded at this location. The remainder of individuals were captured within the Yolo Wildlife Area (n=5) and within the adjacent rice lands (n=10). No giant garter snakes were captured or observed within the Willow Slough Bypass.

Hansen (2008) noted that like in previous years, captures at the Yolo Wildlife Area and adjacent rice lands were concentrated downstream from the Willow Slough Bypass and south of Interstate 80 (I-80) along and in proximity to the drains at the east and west toes of the Yolo Bypass west levee. The number of individuals captured in this area decreased significantly from both 2005 (n=41) and 2006 (n=31). Of the 15 individuals captured there in 2007, six were recaptures originally marked in previous years (three each from 2005 and 2006). As was the case in 2006, a higher proportion of snakes was captured in the rice lands on the west side of the levee (n=10) than along the toe drain and associated laterals and wetlands within the Yolo Bypass (n=5).

Of the five snakes captured on the east side of the levee, four were recaptures from previous years (one from 2005, three from 2006). Three of these snakes (two recaptures, one new) were trapped in the toe drain along the east edge of the levee, and the other two (both recaptures) were trapped in the densely vegetated permanent wetland immediately east of the toe drain. The traps in the wetland were removed twelve days after being set due to diminished water levels which made trapping infeasible. The decrease in capture success on the east side of the levee may be explained in part by the high water levels that occurred in the Yolo Bypass during the winter of 2005/2006, and the possibility that the remaining snakes were not detected because they were spending more time in the bypass wetlands where trapping efforts were hampered by shallow conditions (E. Hansen February 2008, letter to David Kelly).

On the west side of the levee, several changes in habitat conditions were observed compared with the two previous years; these changes may have further contributed to the decreases in capture success in this area. The rice field immediately west of the levee and south of the El Macero Channel was fallow in 2007, which coincided with significant reductions of water levels in the El Macero Channel and the toe drain along the west side of the levee where giant garter snake captures were most numerous in 2006. The water level in the El Macero Channel was too low for trapping in 2007; eight individuals were captured there in 2006. Hansen (2008) reported that while water within the toe drain was also low, the flow rate was notably higher than in previous years, likely reducing trapping effectiveness and overall habitat suitability. Only two individuals were captured in the toe drain in 2007 (one new, one recapture from 2005), compared to eight in 2005 and eleven in 2006. The remaining snakes captured in the rice lands on the west side of the levee were trapped in the ditches along the north and south edges of the rice field immediately west of the fallow field. Four individuals were captured in each of these ditches, one being a recapture from 2005. In contrast to observations in both 2005 and 2006, no giant garter snakes were detected moving from one side of the levee to the other during the 2007 field season (Eric Hansen February 2008, letter to David Kelly).

Additional habitat has been created in Yolo Bypass south of south of the I-80 causeway in the form of the 15,830 acre Yolo Bypass Wildlife Area. This area includes the areas sampled by Eric Hansen which is described above.

A habitat conservation bank has been established south of I-80 inside Yolo Bypass in part for the purpose of selling giant garter snake credits to developers or others who need to compensate for environmental impacts to the species from their projects. Pope Ranch, a 391-acre ranch in Yolo

County, has sold all of their giant garter snake credits, ensuring that the habitat on the site is managed for the benefit of the species and protected in perpetuity. There is a CNDDB record from 2008 reporting the presence of giant garter snake at Pope Ranch, and during a survey conducted for an adjoining property in 2009, Hansen (2009) documented a snake within a half mile of Pope Ranch.

The Yolo Basin is largely rural, but has not escaped the recent effects of rapid California development. Urban and commercial development in Davis and Woodland results in direct habitat loss and also may expose snakes to secondary effects including water pollution from urban run-off and increased vehicular mortality, both of which act in concert with direct habitat loss and degradation to further threaten the snake in the Yolo Basin. Also, development promotes road widening and bridge replacements, such as those authorized under section 7, which result in direct alteration of snake habitat. Other projects affecting the environment in and around the action area include the levee reconstruction following the flood events of 1997 and 1998 and the reconstruction and the raising of the levees along the east side of the Bypass that surround West Sacramento. Mitigation required for the loss of giant garter snake habitat during this construction was responsible for the creation of the Pope Ranch Mitigation Bank.

The Yolo Basin sub-population is within the rice production zone where giant garter snakes are known to occupy the maze of interconnected agricultural water delivery and drainage facilities (Service 1993). Although rice fields and agricultural waterways can provide valuable seasonal foraging and upland habitat for the snake, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and waterways can degrade snake habitat and increase the risk of snake mortality (Service 2003). On-going maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, fragment existing habitat, and prevent dispersal of snakes (Service 2003).

American Basin Sub-population. The action area includes the American Basin sub-population which occurs in portions of Yuba, Placer, Sutter, and Sacramento Counties. Two Habitat Conservation Plans (HCPs) developed in this basin collectively permit the loss 6,896 acres of habitat for the snake (Service 2003). At the time these plans were implemented, approximately 24,567 acres of the 53,537 acres basin was characterized as GGS habitat (rice or marsh). Although a report of giant garter snake surveys conducted between 2000 and 2003 states that it is still too early to determine whether the HCP mitigation efforts have resulted in increasing the numbers of giant garter snake, positive trends have been observed in some areas (City of Sacramento 2004, TNBC 2006b). Mitigation properties reported to support the giant garter snake continue to do so and four acquisition sites on which no giant garter snake were found during baseline surveys reported giant garter snake sightings in 2003 (City of Sacramento 2004). On the other hand, Paquin *et al.* (2006) suggested that the El Centro population (Fisherman's Lake) within the Natomas Basin suffered catastrophic population declines due to habitat loss since the beginning of her study in 1998; however, no population estimates subsequent to 1998 are currently available. Within the Natomas Basin, good quality giant garter snake habitat is found scattered mostly in the northern region, generally north of Elverta Road (Wylie *et al.* 2002a), although suitable snake habitat is found throughout most of the basin.

Status of Populations in the San Joaquin Valley

San Joaquin Valley sub-populations of giant garter snakes have suffered severe declines and possible extirpations over the last two decades. Prior to 1980, several areas within the San Joaquin Valley supported populations of giant garter snakes. As recently as the late 1970's and perhaps early 1980's, a relatively small acreage of habitat in and around the northern portions of the Mendota Wildlife

Area (WA) and to a lesser extent, Mendota Pool, supported a robust population of giant garter snakes. However, flooding during the winter of 1985-1986, presence of predatory fish, vehicular mortality, and disturbance and persecution by fishermen and recreationists, apparently has depleted population levels at this former stronghold (J. Brode, pers. comm. 1992; G. Hansen, pers. comm. 1992; R. Hansen, pers. comm. 1992). In the North and South Grasslands, 24 records in the California Natural Diversity Data Base, all prior to 1976, delimited a formerly extensive complex of occupied suitable habitat, probably the largest regional population in the San Joaquin Valley since the reclamation of the Tulare and Buena Vista lakebeds. A recent history of selenium and salinity contamination throughout this area and absence of any giant garter snake sightings in much of its historic range in the Grasslands indicates this population is at risk (USFWS 1993). In many areas, the restriction of suitable habitat to water canals bordered by roadways and levee tops renders giant garter snakes vulnerable to vehicular traffic and vegetation maintenance practices. The Final Rule to list the giant garter snake as threatened concluded that threats to this population are imminent and severe (USFWS 1993). Recent survey data indicate that giant garter snakes are still extant in one locality within the San Joaquin (e.g., Volta WA and Los Banos Creek), but may be nearing extirpation in previously inhabited areas (e.g., South Grasslands and Mendota Pool) (Hansen 2008a and 2008b).

Surveys conducted by Hansen in 1986-87 of 38 previously occupied localities and by Beak in 1992 of 7 localities did not detect any giant garter snakes (Hansen 1988; Beak 1992 as cited in USFWS 1993). During 1995 surveys of prior locality records and adjacent waterways, one road-killed giant garter snake was found, and three presumed giant garter snakes were observed but not captured. Two sightings occurred at Mendota WA, and two occurred several miles south of the town of Los Banos (Hansen 1996).

In April 1998 the Dixon Field Station of the Western Ecological Research Center, U.S. Geological Survey (USGS) began a survey for giant garter snakes in the San Joaquin Valley. The effort yielded the capture of seven female and four male giant garter snakes, for a total of 11 individuals. The majority of the snakes were caught in the North Grasslands; seven were caught in Los Banos Creek west of Kesterson NWR, three were caught at the Volta State WA, and one was caught in the South Grasslands. Snake densities in the San Joaquin Valley seemed extremely low in comparison to study areas in the Sacramento Valley (Wylie 1998).

In 1999, surveys for giant garter snake were conducted by the CDFG out of the Los Banos Wildlife Area and were performed according to USGS protocols. Fourteen new giant garter snakes were captured and eleven were recaptured as part of this effort. No captures were made in the Los Banos WA. Fifteen snakes were captured in Los Banos Creek, and eleven at Volta State WA. All of these recent sightings were in areas to the west of surface waters that have been impacted by agricultural drainage discharges. In addition to CDFG surveys in 1999, M. Paquin of the USGS conducted walking surveys in the South Grasslands during May and June 1999. Three snakes were located as a result of the surveys, two road kills and one live-capture. The live snake was captured in the Agatha Canal, one road kill was found on Santa Fe Grade Road, and one on Mallard Road near the Agatha Canal (Beam *et al.* 1999). The sightings are within or near the Grassland Wetland Supply Channels, where water quality has improved since the onset of the GBP but continues to be impacted by selenium-contaminated drainage.

In 2001, CDFG continued surveys for giant garter snake the publicly and privately owned lands in the Grasslands Ecological Area and at the Volta WA in Merced County, as well as the Mendota WA and Alkali Sink Ecological Reserve in Fresno County. As a result of this effort, fourteen snakes

were captured in the Mendota WA and one in the Southern Grasslands Ecological Area. Five of the fourteen snakes captured in one waterway of the Mendota WA and the one snake captured in the South Grasslands had cyst-like lumps on their bodies (Dickert 2002; 2005).

In 2003, CDFG performed visual searches for giant garter snakes on private properties as well as on the China Island, Volta and Los Banos WAs. Trapping resulted in the capture of 29 giant garter snakes, all from the Volta WA (an area with no history of selenium contamination from subsurface agricultural drainage water). Eleven of the captured snakes had lumps on their bodies that were suggestive of a parasitic nematode infection. CDFG estimated the population size of giant garter snakes in the Volta Wasteway to be 45 (Dickert 2003).

In 2004, CDFG conducted visual surveys along roads in the Volta WA and private land within the Grassland Resources Conservation District. No giant garter snakes were seen or captured during these visual surveys. In addition, CDFG in 2004 continued trapping for giant garter snakes in the Volta WA. That trapping effort yielded 13 individual garter snakes, four of which had visible external cysts (Sloan 2005).

A parallel trapping effort conducted throughout the San Luis NWR complex during 2004 did not detect any giant garter snakes (Williams et al. 2004). Trapping was conducted again by CDFG in 2006 at Mud Slough (South) and Volta, resulting in 7 giant garter snakes captured within the Volta Wasteway: none were captured at Mud Slough (South) (CDFG 2006a).
In 2006, E. Hansen conducted surveys at fifty unique locations in the Grasslands Ecological Area, including GWD and the Agatha Canal in the South Grasslands. That trapping effort yielded eight individual giant garter snakes, seven caught in Los Banos Creek (upstream of Kesterson NWR and no history of selenium impairment) and one individual caught in the South Grasslands at the Agatha Canal, just a few miles north of the proposed expansion of SJRIP drainage reuse area of the Panoche Drainage District (Hansen 2007).

In 2007, E. Hansen established thirty-one traplines south of the San Joaquin River at areas of historical giant garter snake occurrence along the Los Banos Creek and Santa Fe Grade corridors, San Luis NWR complex, the of privately owned wetlands situated within GWD and Mendota WA. In South GWD (south of Highway 152), traplines were established in Poso Canal, Agatha Canal, and Bennett Drain. Within North GWD (north of Highway 152), traplines were established within West Side Ditch, Los Banos Creek, Mosquito Ditch (northern end of the Volta Waste Way), Salinas Service Ditch, Ingomar Drain, Hollister Drain, Eagle Ditch, and San Luis Spillway Ditch. Although one giant garter snake was captured in South GWD a historically occupied locality at the junction of Agatha Canal and Poso Drain during 2006, none were captured in 2007. Traplines were established within the San Luis, Blue Goose, Freitas, Kesterson, and West Bear Creek units of San Luis NWR complex but did not result in giant garter snake encounters despite their proximity to historical occurrences. Four giant garter snakes were captured in all. Of these four giant garter snakes, one was captured twice, constituting a decrease from 33 capture events in 2006 to 5 capture events in 2007 despite the increase in trapping effort. Two of the four snakes captured in 2007 were marked previously in 2006. All the snakes were encountered along the Los Banos Creek corridor between the San Joaquin River and the City of Los Banos within the Salinas Service Ditch, Mosquito Ditch, Hollister Drain, and Eagle Ditch (Hansen 2008a).

In 2008, E. Hansen established ten 50-trap transects and placed along the Los Banos Creek corridor within the GWD (which was trapped in 2006 and 2007), the Mendota WA (which was trapped in 2007), the Volta WA (which was last trapped in 2006 by the CDFG), and within the GBP's SJRIP

drainage re-use area newly acquired lands (just south of the South Grasslands wetlands). Twenty two traplines were established in total with 38,339 trap days accrued (13,913 in the Los Banos Creek corridor; 13,900 at Mendota WA; 7,889 at Volta WA; and 2,637 in the SJRIP drainage reuse area). Nineteen individual giant garter snakes (10 males and 9 females) were captured in 36 total capture events; eight individuals were captured more than once. Of these nineteen snakes, three were captured in the Los Banos Creek corridor within the GWD, one was captured in Fresno Slough at the Mendota WA (the only giant garter snake encountered at Mendota WA after two consecutive years of intensive trapping effort), and fifteen were captured within the Volta WA.

Considering the many, intensive surveys that have been conducted by qualified biologists since the mid 1970's in the San Joaquin Valley, low numbers of individual giant garter snakes have been documented. Although habitat has been lost or degraded throughout the Central Valley, there have been many recent sightings of giant garter snakes in the Sacramento Valley while there have been very few recent sightings within the San Joaquin Valley Service 2012).

The 1995 report on the status of giant garter snakes in the San Joaquin Valley (Hansen 1996) indicates that Central San Joaquin Valley giant garter snake numbers appear to have declined even more dramatically than has apparently suitable habitat. Factors in addition to habitat loss are likely contributing to the decline. Threats affect giant garter snakes within otherwise suitable habitat and include interrupted water supply and poor water quality (Hansen 1996). The consistent absence of giant garter snake sightings from certain previously occupied localities indicates the apparent extirpation or dramatic population declines of several former populations. Outside the Sacramento Valley, giant garter snakes currently occur only in low numbers; population strongholds do not appear extant due to limited quality and extent of available habitat (such as is the case in Mendota Pool).

Factors Affecting the Snake within the Action Area

As noted in the Giant Garter Snake 5-Year Reviews: Summary and Evaluation (Service 2006 & 2012), the overall status of the giant garter snake has not improved since its listing. The Colusa Basin sub-population supports a better documented, relatively larger, and more stable giant garter snake sub-population (Wylie *et al.* 2004a; Wylie and Martin 2004); its continued healthy persistence is, therefore, extremely valuable for survival and recovery of the snake. Yet, the Colusa Basin sub-population continues to be impacted by past and present Federal, State, private, and other human activities.

The Colusa Basin is largely rural, but has not escaped the recent effects of rapid California development. Urban and commercial development results in direct habitat loss and also may expose snakes to secondary effects including water pollution from urban run-off and increased vehicular mortality, both of which act in concert with direct habitat loss and degradation to further threaten the snake in the Colusa Basin. Also, development promotes road widening and bridge replacements, such as those authorized under section 7, which result in direct alteration of snake habitat.

Ongoing agricultural and flood control activities may decrease and degrade the remaining habitat throughout the snake's range, further affecting the environmental baseline for the snake. Agricultural activities are largely not subject to section 7 consultation. The Colusa Basin sub-population is within the rice production zone where giant garter snakes are known to occupy the maze of interconnected agricultural water delivery and drainage facilities (Service 1993). Although rice fields and agricultural waterways can provide valuable seasonal foraging and upland habitat for

the snake, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and waterways can degrade snake habitat and increase the risk of snake mortality (Service 2003). On-going maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, fragment existing habitat, and prevent dispersal of snakes (Service 2003).

Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and rip-rapping of streams and canals (Service 2003). Flood control programs are administered by the U.S. Army Corps of Engineers (Corps) and the Corps has typically consulted on previous projects and is expected to continue to do so for future projects. The ongoing nature of these activities and the administration under various programs, however, makes it difficult to determine the continuing and accumulative effects of these activities.

In addition to projects already discussed, projects affecting the environment in and around the action area include transportation projects with Federal, county, or local involvement. The Federal Highway Administration and/or the Corps have consulted with the Service on the issuance of wetland fill permits for several transportation-related projects within the Colusa Basin that affected snake habitat. The direct effect of these projects is often small and localized, but the effects of transportation projects, which improve access and therefore indirectly affect snakes by facilitating further development of habitat in the area and by increasing snake mortality via vehicles, are not quantifiable.

Radiotelemetry studies conducted by USGS-WERC have examined giant garter snake habitat use in several areas in the Sacramento Valley. At the Gilsizer Slough study site in Sutter County, snakes were located in rice fields 19-20 percent of observations, marsh habitat 20-23 percent of observations, and in canal and waterway habitat 50-56 percent of observations (Service 1999). At the Colusa NWR study site, snakes used rice field in 19 percent of observations, marsh in 20 percent of observations, and canals in 50 percent of observations. USGS-WERC also examined a study site in the Natomas Basin where only rice and canal habitat was available. Once vegetation was emergent in the rice fields, giant garter snakes used rice fields 39-60 percent of the time and canals 40-61 percent of the time (Wylie and Casazza 2000). Thus both rice fields and canals are important habitats for the snake.

Researchers with the USGS estimated the home range size of giant garter snakes at four study sites. Home range (area of daily activity) averages about 0.1 mile^2 (25 hectares) in both the Natomas Basin and the Colusa NWR (Wylie 1998; Wylie *et al.* 2002a; Wylie *et al.* 2002b). Home range estimates for giant garter snakes near the restored wetlands at Colusa NWR were generally smaller than previously found at the refuge when the lands were managed for waterfowl and in other off-refuge study areas (Wylie *et al.* 2000a). It is believed that maintaining water in the restored wetlands and nearby habitat provided sufficient conditions to meet the biological requirements of the giant garter snakes; thus, individuals were less likely to move further distances as in previous years when conditions were drier and water was not maintained specifically to benefit giant garter snakes (Wylie *et al.* 2000a). These managed areas apparently met the biological needs of the snakes, thereby reducing their movements. The Badger Creek area also appeared to be an example of where permanent wetland and sufficient habitat reduces giant garter snake movements. There the home range (N=8) was estimated to be 4 to 82 hectares (10 to 203 acres) for an area 234.7 hectares (580 acres) in size.

USGS-WERC has also estimated home range sizes for giant garter snakes and determined that median home ranges are generally less than 100 acres in size, demonstrating that giant garter snakes typically use relatively small areas, even though they are capable of moving longer distances (up to five miles in a few days). Home range sizes for giant garter snakes at the Gilsizer Slough study site varied from approximately 5 acres to 212 acres with a median of 39.5 acres. In the Natomas Basin, home range sizes varied from 32 acres to 214 acres with a median of 86 acres. USGS-WERC has also studied giant garter snakes at the Colusa National Wildlife Refuge. Home range sizes at Colusa NWR have been highly variable. Home range sizes estimated for year 2000 ranged from 2.5 to 81.5 acres with a median of 42 acres and for 2001 from 7.4 to 427.5 acres with a median of 59.3 acres. These home ranges are about half the size of those estimated for the study period 1996-97 (home ranges varied from 3.2 acres to 279.2 acres with a median of 103.8 acres). USGS-WERC concluded that home range sizes decreased as more summer water became available to the snake on the refuge in the later study period.

Restored areas that provided summer water were more effective in meeting the habitat needs of the snake in the 2000-2001 study periods; therefore, snakes did not have to venture as far as in previous years to find aquatic habitat during their active period. This was also found to be true for monitoring conducted during 2005. Sampling of the restored areas in Colusa NWR during the summers of 2002 and 2003 continued to document use of the restored wetland area as the habitat quality improves. The aquatic component of the habitat is important because the snake forage on frogs, tadpoles and fish. Most of the radio-marked snakes were captured along the water's edge of the wetlands (Wylie *et al.* 2005). USGS-WERC also concluded that reduced movements indicated that giant garter snakes were less exposed to mortality factors such as predators and vehicles (Service 1999, Wylie and Casazza 2000, Wylie et al 2002).

In the final rule listing giant garter snakes as threatened (October 20, 1993, 58 **FR** 54053), fluctuations in rice production and changes in water management including reduction in water availability due to drought and water transfers were cited as threats to the continued existence of the giant garter snake. The Service concluded that these factors in combination with other threats put the Butte, Colusa, and Sutter Basin populations of giant garter snakes at risk of moving from the status of threatened to endangered, all other areas were considered to be at risk of extirpation. In addition, the Draft Recovery Plan for the Giant Garter Snake (Service 1999) (Draft Recovery Plan) considers the maintenance of rice cultivation to be important to the continued existence of the species. In addition to restoration of wetland habitat, the draft Recovery Plan proposes recovery tasks to protect rice lands, to develop methods to assure water deliveries to support giant garter snakes, and promote maintenance of cropping patterns that benefit the snake. As reported in the Five Year Reviews (Service 2006 & 2012), the abundance and distribution of giant garter snakes have not changed significantly since the time of listing. Although some snakes have been discovered in several southern populations that were thought to be extirpated, these populations remain in danger of extirpation because their numbers remain very low and discontinuous, and they are located on isolated patches of limited quality habitat.

The Five Year Review concluded that by far the most serious threats to giant garter snake continue to be loss and fragmentation of habitat from urban and agricultural development and loss of habitat associated with changes in rice production. Activities such as water management that are associated with habitat loss are also of particular concern because they exacerbate the losses from development and from loss of rice production. Populations range-wide are largely isolated from one another and from remaining suitable habitat. Without hydrologic links to suitable habitat during periods of drought, flooding, or diminished habitat quality, the snake's status will decline (Service 2006, 2012).

The period immediately preceding the listing of the giant garter snake included California's most recent multi-year statewide drought – 1987-1992 (California Department of Water Resources 2008 at cdec.water.ca.gov). This drought, coupled with low rice production (USDA-NASS Quick Stats – Rice at www.nass.usda.gov), likely contributed to the declines in giant garter snake populations that led to the listing of the snake as a threatened species. For a wetland-dependent species like the giant garter snake, drought or drought-like conditions are a serious threat to the long-term survival and recovery of the species.

The Recovery Plan concluded that maintenance of rice cultivation is important to the continued existence of the species. In addition, the recovery plan proposes recovery tasks to protect rice lands, to develop methods to assure water deliveries to support giant garter snakes, and promote maintenance of historic cropping patterns that benefit the snake.

Many areas supporting giant garter snakes have been documented to have abundant predators (R. Hansen 1980, Hansen and Brode 1993, Wylie *et al.* 1997). G. Hansen (1986) observed that nearly all giant garter snakes captured and examined showed scars or recent injuries, presumably acquired during attacks by predators. R. Hansen (1980) concluded that the abundance and diversity of predators suggested that predation pressure probably is severe. However, predation is not believed to be a limiting factor in areas that provide abundant cover, high concentrations of prey items, and connectivity to a permanent water source (Wylie *et al.* 1997).

Habitat degradation or alteration that benefits non-native species may increase the vulnerability of giant garter snakes to predation. Introduced game fish such as largemouth bass (*Micropterus salmoides*) and catfish (*Ictalurus* species) prey upon giant garter snakes and have been responsible for eliminating many species of native fishes and aquatic vertebrates in the western United States (Minkley 1973, Moyle 1976). Brood areas free of predatory fish may be important in that these areas allow juvenile giant garter snakes to grow large enough to avoid predation by game fish (G. Hansen pers. comm. 1998). Introduced predatory fish may also compete with giant garter snakes for smaller forage fish (G. Hansen 1986, California Department of Fish and Game 1992).

EFFECTS OF THE PROPOSED ACTION ON GIANT GARTER SNAKE

The proposed action will result in fallowing a maximum of 51,112 acres of rice land if the full amount of 168,669 acre feet of surface water is transferred as a result of crop idling. This amount of acreage potentially fallowed would result in acres of rice production that falls within the range of production from 1992 to 2011 (with only one year of transfers), would be approximately the average (Table 3) and above the low of 1993 (Table 3).

This reduction in habitat will likely result in increased stress on snakes that must disperse further to find suitable habitat, a likely reduction in prey base (particularly for young [< 2 years old] snakes), the potential displacement of individual snakes, increased risk of predation on snakes, and the potential for reduced reproduction and recruitment. All of these factors may result in the loss of individual snakes through increased mortality or reduced or forgone reproduction by snakes in affected areas.

To the extent that reducing the available habitat can affect the likelihood of survival and reproduction of individual snakes if individuals are unable to assimilate in to remaining suitable habitat, this occurrence on a large scale may have population-level effects, particularly if the quantity of available habitat is reduced persistently, over time, or undergoes annual fluctuations of high

magnitude. Should this occur, it can affect the population well beyond the duration of the proposed action (i.e. one year). Fallowing of land appears to reduce or eliminate giant garter snake capture success in adjacent canals (Wylie *et al.* 2004). However, we have no data that indicate the extent that snakes successfully relocate and assimilate into adjacent or nearby habitat when rice lands are fallowed, the extent to which the configuration of the landscape mosaic of rice fields and fallowed rice affects the success of individuals to assimilate, the extent to which snake population trends respond not only to fallowing but to subsequent increases in rice cultivation, or the degree to which fluctuation in rice acreage over time mirrors variability in the snake population over time.

The proposed fallowing or planting alternate crops on up to 51,112 acres under the proposed action of crop idling/shifting (Table 2) would occur in addition to fallowing from farm activities being done in the rice lands not participating in the 2014 water transfers. The fallowing under the proposed action is above and beyond that done under normal crop rotation programs or water conservation programs in a dry year. Maximum fallowing as a result of the proposed action would be approximately 10.5 percent (51,112 AF/487,080 AF) of the average rice grown in the Sacramento Valley from 1992 to 2011 (Table 3).

The proposed fallowing or crop conversion of up to 51,112 acres of rice fields to alternate crops in the action area will reduce the availability of stable wetland areas which may be used by giant garter snake populations. The importance of stable wetlands was reported in the 2005 Monitoring Report for the Colusa NWR that concluded that, "The management of the Colusa Refuge for giant garter snakes, which began with the restoration of Tract 24, has clearly benefitted the snakes in the restored wetlands and other habitats by maintaining and increasing stable summer water habitats for the snakes, maintaining connectivity among wetland habitats and carefully managing marsh vegetation." (Wylie *et al* 2005).

Trapping efforts in the "Snake Alley" area of the Natomas Basin have resulted in fewer snakes being trapped in years when much of the rice fields in this area were fallowed (E. Hansen, pers. comm. 2008). Although it is unknown where the snakes relocated to or if they were able to find suitable breeding and feeding aquatic habitat elsewhere, these results suggest that at the least snake distribution depends on where the rice fields are. Habitat conditions in "Snake Alley" are similar to what is found in much of the action area in the Sacramento Valley; that is a matrix of agricultural fields and canals and ditches. Giant garter snakes can move considerable distances in days or months when resources are limited, suggesting that adult snakes may disperse widely in search of shallow summer aquatic habitat such as rice if it is not available when they emerge from overwintering. However, the time and effort that is expended even travelling relatively short distances to find suitable aquatic habitat may reduce the fecundity of female snakes who would otherwise be expending that effort on breeding, feeding, and other essential life functions (G. Wylie, pers. comm. 2008). In addition, giant garter snakes exhibit some level of site fidelity, and will not move far from a site that has permanent water and prey items (E. Hansen, pers. comm. 2008); suggesting that fallowing their habitat would result in additional stress on individual snakes.

The proposed fallowing or conversion to alternate crops of up to 51,112 acres of rice fields in the action area may reduce foraging success due to lack of familiarity with the area, increased foraging effort because of more widely dispersed prey resources, increased competition for prey items with resident snakes or other displaced snakes, and reduced prey resources that are also dependent on rice land habitats. Migrating snakes or snakes using a larger foraging area may displace resident snakes or compete for food and shelter resources with resident snakes. This will result in reduced survivorship and fecundity of both resident and immigrant snakes. Fallowing will also result in

reduced prey availability by reducing the acreage of flooded rice fields which act as seasonal marshes in producing high numbers of tadpoles, frogs and mosquitofish for the snake to feed on (E. Hansen 2008, pers. comm.).

Adverse effects from the proposed fallowing or conversion to alternate crops of up to 51,112 acres of rice fields in the action area may be greatest for juvenile snakes due to the loss of rice fields and wetland areas suitable for forage. Abundant food resources are also essential for females to both recover body mass after giving birth and to survive the overwintering period when the snakes do not forage. Abundant food resources are also essential to the survival of juveniles and neonates. Giant garter snakes typically double their weight in the first year, with rapid growth likely necessary to reach a size class no longer susceptible to predation by non-native predatory fish and bullfrogs. Small prey items are particularly important to snakes that are less than 2 years old because they physically cannot feed on larger items. Lack of small prey would inhibit growth and result in delayed sexual maturation of snakes, resulting in decreased births and recruitment of individuals into the population, potentially skewing the age structure of the population to older giant garter snakes. Juveniles and neonates also rely on developing sufficient body mass prior to overwintering in order to survive long periods without foraging.

The proposed fallowing or conversion to alternate crops of up to 51,112 acres of rice fields in the action area may result in an increased risk of predation on individual giant garter snakes when they leave a fallowed field in search of a suitable location after emerging from overwintering. Rice fields provide cover for snakes to escape predators. Ditches, canals, and other agricultural conveyances typically do not provide much cover in the form of emergent vegetation. Predators such as large fish, egrets, and herons are more prevalent in ditches and canals and are known to prey on giant garter snakes.

Conservation Measures-Conservation Measures are described in the BA and in Appendix 1of the BA. In addition to the implementation of the Conservation Measures/Environmental Commitments described here and included in Section 2.4 and Appendix 1 of the BA, it is likely that most canals and waterways will remain wetted with a minimum of two feet of water during the summer months; however these features only make up a portion of giant garter snakes aquatic habitat. These measures will serve to minimize the adverse effects of fallowing.

Given that giant garter snakes rely on rice lands or wetlands for foraging and predator avoidance, the significant reduction in the amount of rice within the northern portions of the action area with the proposed action, it can be expected that giant garter snakes in the vicinity of fallowed rice fields may be adversely affected as a result of the reduction in habitat and summer water available, increased competition for resources in the remaining habitat, and increased predation as snakes attempt to relocate to suitable areas.

This reduction in habitat in turn may decrease prey populations and reduce foraging success. Effects of decreased foraging success include reduced survival, reproduction, and recruitment. The reduced habitat available and more widely dispersed prey and habitat resources will cause snakes to either be displaced or move over a much wider area to meet their habitat needs (as evidenced by the Colusa NWR monitoring that indicates giant garter snakes must travel over wider areas when habitat conditions are less favorable), resulting in increased mortality from predation and increased competition with other giant garter snakes for limited resources.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We have no information on tribal or local government actions reasonably certain to occur in the action area.

Twelve SWP contractors are planning to sell water to buyers located south of the Delta. These SWP contractors plan to sell a total of 196,217 acre-feet of water normally used to grow rice on 35,369 acres (Table 8). Fallowing as a result of these water transfers would be approximately 7.3 percent (35,369 AF/487,080 AF) of average rice grown in the Sacramento Valley from 1992 to 2011. Combined with the lands fallowed as a result of the 2014 water transfers (51,112 acres or 10.5 percent of the total ricelands), there will be a combined fallowing of 86,481 acres or 17.8 percent of the average of rice grown in the Sacramento Valley from 1992 to 2011.

In addition, Sacramento and Feather River contractors will not receive full allocations of water based on the dry year forecast (Table 1). This is a non-discretionary action by the BOR based on the environmental conditions, is not part of the proposed action and thus, is considered here in cumulative effects. This is an unprecedented forecast and allocation, is not part of the "normal" or previously "averaged" conditions as described in Table 3, and thus, no data is available to determine what if any reduction in rice production will occur with a reduced allocation. One irrigation district manager speculated that up to a 15% reduction of rice production in his district may result with the allocation (T. Bettner 2014).

Table 8. Potential Additional Cumulative Sellers (Upper Limits)

(Acre Feet)		
Water Agency	**Groundwater Substitution**	**Cropland Idling/Shifting**
Feather River Area of Analysis		
Butte WD	5,350	11,055
Cordua ID	12,000	
Gilsizer Slough	5,300	
Richvale ID		21,120
Plumas MWCMWC	3,500	
Sutter Extension WD	4,000	11,000
Western Canal WD		35,442
Yuba County Water Agency	30,000	30,000
Sacramento River Area of Analysis		
Garden Highway Mutual Water Company	9,000	
Tule Basin Farms	6,400	
Delta Area of Analysis		
Reclamation District 2068	1,150	7,500
Pope Ranch	2,800	600
Total	79,500	116,717

Abbreviations:
ID: Irrigation District
MWC: Mutual Water Company
WA: Water Agency
WD: Water District

We anticipate that the frequency and magnitude of rice land fallowing resulting from forbearance agreements and water transfers for both CVP and SWP water are likely to increase in the future, as the price for water that farmers get for idling rice increases compared to the prices they receive for planting their crop. However, we do believe that because transfers of this magnitude are likely to occur with some certainty and regularity in future water years, chronic adverse effects to giant garter snake and their habitats may result in long-term degradation to snake populations in the lower Sacramento Valley.

Repeated episodes of the water contractors fallowing ricelands in order to transfer water may also result in reduced survivorship or fecundity when females are displaced from familiar retreats and basking sites. Abundant food resources are also essential for females to both recover body mass after giving birth and to survive the overwintering period when the snakes do not forage, and for young snakes which rely on smaller prey items most typical of rice fields. Fallowing of rice fields will not only temporarily remove suitable habitat, but may adversely affect reproduction, recruitment, and survival of giant garter snakes over time.

CONCLUSION

After reviewing the current status of the species considered in this opinion, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that implementation of the proposed action as described, will likely result in the loss of an unknown number of giant garter snakes as a result of increased mortality from increased competition for resources, reduced reproductive rates, and increased mortality from predation when crossing dewatered areas in search of suitable forage areas. However, we do not anticipate that the delivery of water south of the Delta will adversely affect the giant garter snake

sub-populations found in the San Joaquin Valley because the water will be delivered to urban areas or agricultural areas that have been under cultivation for each of the past three years.
The reasonable certainty of adverse effects to the giant garter snake results from fallowing or planting non-wetland crops on up to 51,112 acres of rice lands. Therefore, the proposed action will adversely affect the short-term ability of individual giant garter snakes to forage, reproduce, and find shelter. We are not able to accurately predict the number of individual giant garter snakes that will be lost because there are no population data available for the action area.

As described above, the proposed action will reduce suitable giant garter snake foraging habitat by approximately 10.5 percent from the average of all rice croplands from 1992 to 2011 in the action area. As a result, we anticipate that some individuals may have to relocate from an area that may have been their foraging area in prior years. Although individual snakes that must relocate are likely to be subject to greater risk of predation as they move to find new suitable foraging areas, we anticipate that some individuals will be able to successfully relocate to suitable habitat elsewhere within the action area. Young snakes (2 years old and less) that need to relocate may be particularly vulnerable to the increase predation risk, either in the fallow fields or in the adjoining canals. The requirement to leave water in water conveyance infrastructure, such as drains and canals, in areas of suitable habitat that are likely to be occupied by GGS will reduce the distance to a wetted suitable habitat for most GGS in areas targeted for water transfer idling/shifting. In addition to the risks associated with relocation, a reduction in available habitat and foraging opportunities compared to recent years may adversely affect foraging success and breeding condition of individuals that are unable to relocate. Again, we anticipate young snakes to be at a greater risk.

We do not know and have no information with which to estimate the size or age-class structure of the resident snake population in the action area. The population structure is likely a product of annual fluctuation in acreage planted to rice prior to 2014, in combination with other physical and environmental factors. We anticipate that the 2014 fallowing is likely to increase predation risk, and decrease foraging success and breeding condition in individuals to a similar degree and magnitude that has occurred in previous years. While the 2014 rice acreage is expected to be within the range from 1992 to 2011 and near the average of the same time period, the proposed action could result in the lowest acreage planted in rice since 1995 if the maximum number of acres is fallowed (Table 3).

If there is a population that has persisted in the action area during this time, we would not anticipate the effects of the 2014 water transfers to impair the ability of that population to continue to persist. We anticipate that some individuals are likely to be displaced and will need to relocate elsewhere. Of these individuals, we expect that some will successfully relocate, and that some may be lost to predation or other forms of mortality caused by loss of foraging opportunities, either through competition with other individuals or loss of body condition and failure to thrive, particularly young snakes.

After reviewing the current status of giant garter snake, the effects of the proposed action including the environmental commitments/conservation measures and the cumulative effects, we have determined that implementation of the proposed action will not jeopardize the continued existence of giant garter snake in the action area.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to

engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement. This incidental take statement does not authorize any incidental take of listed species resulting from related actions that are not part of or controllable by Reclamation, 2014 water transfer water sellers, or 2014 water transfer water purchasers, and that are not included in the project description of this biological opinion.

The measures described below are non-discretionary, and must be implemented by Reclamation so that they become binding conditions of any agreement, contract, grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any agreement, contract, permit, or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Incidental Take

The Service anticipates incidental take of giant garter snakes will occur. Giant garter snakes are secretive and known to be sensitive to human activities. Individual snakes are difficult to detect unless they are observed, undisturbed, at a distance. Most close-range observations represent chance encounters that are difficult to predict. The Service anticipates that an unknown number of snakes that utilize the up to 51,112 acres that are to be fallowed or planted to crops other than rice will be taken as a result of this proposed action. The incidental take is expected to be in the form of harm as displaced snakes may be taken by predators, or may die or suffer reproductive failure if they cannot successfully relocate and assimilate into other suitable habitat on or adjacent to a field fallowed as a result of implementation of this water transfer program.

The proposed fallowing or crop shifting on up to 51,112 acres of rice fields for the proposed action will result in the loss of an undetermined number of individual snakes through increased mortality or reduced or forgone reproduction by snakes in affected areas. Fallowing rice fields or planting crops that do not provide suitable habitat will not only temporarily remove suitable giant garter snake habitat, but may also have adverse effects on reproduction, recruitment, and survival of the snake that would continue to affect giant garter snake populations beyond the projects time frame.

Based on our analysis presented in the **Environmental Baseline** and **Effects of the Proposed Action on Giant Garter Snake** sections, which describe how the majority of the action area, both under current and proposed land management, is considered to be optimal giant garter snake habitat, we anticipate that snakes are likely to be exposed to adverse effects from the proposed rice field fallowing. However, because no estimate of the current giant garter snake population exists and we currently have no means to accurately determine the number of individuals or percentage of the population that may currently exist in or travel onto fallowed lands, the Service is providing an

anticipated level of take based on certain assumptions concerning project configuration and giant garter snake ecology.

As described in the **Status of the Species** section and in the Draft Recovery Plan for the Giant Garter Snake (FWS 1999), the breeding season for the giant garter snake begins soon after emergence from overwintering sites and extends from March into May, and resumes briefly during September (G. Hansen pers. comm. 1998). Males immediately begin searching for mates after emerging (G. Hansen pers. comm. 1991). Females brood young internally, and typically give birth to live young from late July through early September (Hansen and Hansen 1990). Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own (FWS 1993).

Based on the analysis in the **Effects Of The Proposed Action on Giant Garter Snake** section, we believe that all age classes of giant garter snake will be exposed to increased predation as a result of emerging from overwintering and having to search for suitable areas containing food and cover. This exposure may be most problematic for the one and two-year age class since they will need to find a suitable food source to build mass and strength to avoid predators.

Effect of the Take

The Service has determined that the level of potential take from authorization of the transfer of CVP water from the action area north of the Delta is not likely to result in jeopardy to the giant garter snake. Fallowing rice fields or planting crops that do not provide suitable habitat will not only temporarily remove suitable giant garter snake habitat, but will also reduce reproduction, recruitment, and survival of the snake that will continue to adversely affect giant garter snake populations beyond the two year project time frame.

Reasonable and Prudent Measures

The proposed fallowing of up to 51,112 acres of rice fields in the action area will result in the loss of an undetermined number of individual giant garter snakes through increased mortality, or reduced or forgone reproduction by snakes in affected areas. This fallowing of rice fields will not only temporarily remove suitable habitat, but we also anticipate may have adverse effects on reproduction, recruitment, and survival of the snake that will continue to affect giant garter snake populations beyond the projects time frame.

All necessary and appropriate measures to minimize the impacts of incidental take of giant garter snake resulting from implementing the 2014 water transfer have been incorporated into the project description. Therefore, the Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of incidental take caused by the proposed action.

Reasonable and Prudent Measure. All conservation measures as described in the biological assessment, and as restated here in the Project Description of this biological opinion, must be fully implemented and adhered to. Further these conservation measures shall be supplemented by term and condition 2 below.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, Reclamation must comply with the following terms and conditions which implement the reasonable and prudent measure number one. These terms and conditions are non-discretionary.

The following Terms and Conditions implement the Reasonable and Prudent Measure:

1. Reclamation shall condition the contracts between them and potential water sellers to include the conservation measures contained in the project description.
2. Reclamation will provide the maps and other information to the Service within 60 days from receipt of this opinion that show where water was transferred from (sellers) and where conservation measures were implemented.

Reporting Requirements

Reclamation shall submit a monthly compliance report to the Sacramento Fish and Wildlife Office beginning thirty (30) calendar days from signing contracts to participate in the 2014 water transfers. This report shall detail (i) total acreage affected and location where the fallowing occurred; (ii) confirmation that water levels are being maintained in ditches around affected fields; (iii) occurrences of any giant garter snake observed and of incidental take of any giant garter snake, if any; (v) an explanation of failure to meet such measures, if any; and (vi) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to implement recovery actions, to help implement recovery plans, to develop information, or otherwise further the purposes of the Act.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

We propose the following conservation recommendations:

1. Reclamation should assist the Service in implementing recovery actions identified in the *Draft Recovery Plan for the Giant Garter Snake* (U.S. Fish and Wildlife Service 1999) as well as the final plan if issued during the term of the proposed action.
2. Reclamation should work with the Service, Department of Water Resources, and water contractors to investigate the long-term response of giant garter snake individuals and local populations to annual fluctuations in habitat from fallowing rice fields.
3. Reclamation should support the research goals of the Giant Garter Snake Monitoring and Research Strategy for the Sacramento Valley proposed in the Project Description of this biological opinion.
4. Reclamation should work with the Service to create and restore additional stable perennial wetland habitat for giant garter snakes in the Sacramento Valley so that they are less vulnerable to market-driven fluctuations in rice production. The CVPIA (b)(1)other and CVPCP conservation grant programs would be appropriate for such work.

REINITIATION - CLOSING STATEMENT

This concludes consultation with Reclamation on the proposed action to transfer up to 295,924 acre-feet of water in water year 2014. The transfers for water year 2014 will include 168,669 acre-feet of water from fallowing or planting alternate crops on up to 51,112 acres of rice land habitats. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or, (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

This amount and extent of incidental take is considered to be exceeded if more than 51,112 acres are fallowed or planted to non-wetland crops.

The SFWO would like to thank you and your staff for their assistance in providing information, ground-truthing, helping us better understand Reclamation's water contracting process, and commitment to working with us to conserve listed species. If you have any questions on this biological opinsion, please contact Ken Sanchez at (916) 414-6700.

Attachment:

cc:
P. Forsberg and S. Cantrell, California Department Fish and Wildlife, Sacramento, CA
Bruce Oppenheim, National Marine Fisheries Service, Sacramento, CA
Tom Filler. Department of Water Resources, Sacramento, CA
Brad Hubbard, Elizabeth (Liz) Vasquez, -Russ Grimes, Bureau of Reclamation, Sacramento, CA
Kim Turner, Bay Delta Fish and Wildlife Office, Sacramento, CA

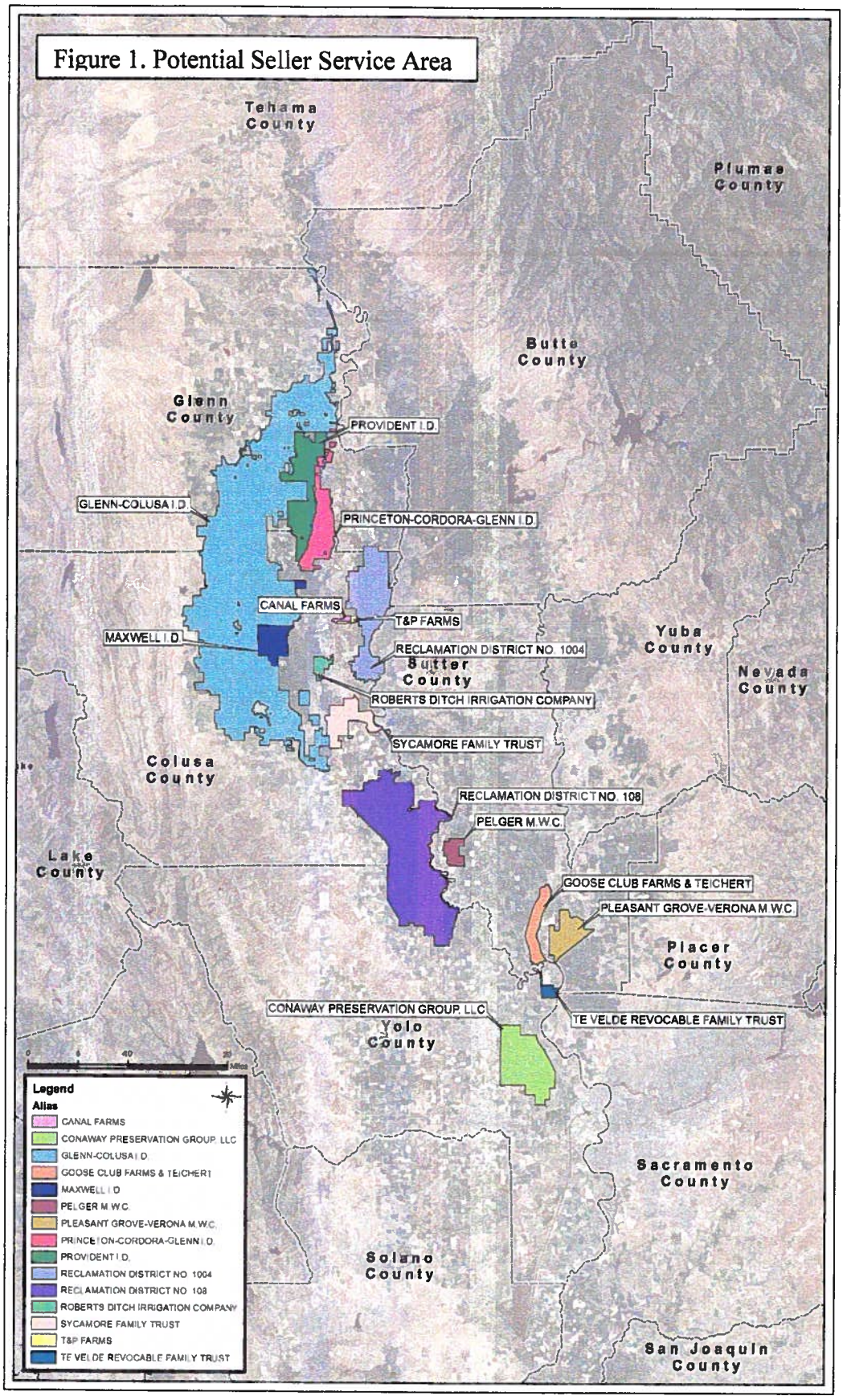
Figure 1. Potential Seller Service Area
Tehama County
Plumas County
Butte County
Glenn County
PROVIDENT I.D.
GLENN-COLUSA I.D.
PRINCETON-CORDORA-GLENN I.D.
CANAL FARMS
T&P FARMS
MAXWELL I.D.
RECLAMATION DISTRICT NO. 1004
Sutter County
Yuba County
Nevada County
ROBERTS DITCH IRRIGATION COMPANY
SYCAMORE FAMILY TRUST
Colusa County
RECLAMATION DISTRICT NO. 108
PELGER M.W.C.
Lake County
GOOSE CLUB FARMS & TEICHERT
PLEASANT GROVE-VERONA M.W.C.
Placer County
CONAWAY PRESERVATION GROUP, LLC
TE VELDE REVOCABLE FAMILY TRUST
Yolo County
Sacramento County
Solano County
San Joaquin County
Legend
Alias
CANAL FARMS
CONAWAY PRESERVATION GROUP, LLC
GLENN-COLUSA I.D.
GOOSE CLUB FARMS & TEICHERT
MAXWELL I.D.
PELGER M.W.C.
PLEASANT GROVE-VERONA M.W.C.
PRINCETON-CORDORA-GLENN I.D.
PROVIDENT I.D.
RECLAMATION DISTRICT NO. 1004
RECLAMATION DISTRICT NO. 108
ROBERTS DITCH IRRIGATION COMPANY
SYCAMORE FAMILY TRUST
T&P FARMS
TE VELDE REVOCABLE FAMILY TRUST

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